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NEWSPAPER

NEWS IN BRIEF

SBC Employee Files Suit Against IBM

SAN FRANCISCO — A Service Bureau Corp. employee has filed a \$100 million class action suit in District Court here against IBM charging that the transfer of SBC to Control Data Corp. deprives SBC employees of important IBM benefits.

The suit was filed by Albert R. Weiss on behalf of "the approximately 1,700 employees of SBC." Weiss also filed a \$10,000 suit on his own behalf.

Some of the benefits named in the suit are the right to purchase stock below price, military benefits and the career progression through "IBM Corp., the acknowledged leader in the computer field."

The suit also noted that "even if an employee of SBC resigned, he could not be rehired by IBM for six years..."

IBM responded to the suit: "We believe the complaint to be entirely without merit. No employees were discharged by IBM as stated in the complaint. And no contractual rights were violated by the IBM/CDC settlement."

The court will have to decide whether Weiss's charges can be classified as a class action. A decision is expected next month.

California Users Ride Out Quake With Little Damage

Special to Computerworld

LOS ANGELES — Computer users rode out a "moderately strong" earthquake here last week with minimal problems.

The epicenter of the quake occurred near the Point Mugu Pacific Missile Range DP center where 50 to 100 tape containers were damaged. The tape vault was also knocked out for a few minutes by a power surge, according to Lloyd Hynds, head of the computer division, who added that no data was lost.

At the Port Hueneme Naval Base DP center, a 360/65 with 24 Potter tape drives and 32 Potter disk drives was shut down for 45 minutes before the tremor, for regular preventive maintenance. "If the systems had been up, they probably would have blown," according to DP chief Victor A. Valla.

On the Inside This Week

Suit Seeks to Prevent

Arrest Record Dispersion

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User Spending May Reach

\$23 Billion in 1973

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★ Special Report: Putting Software to Work ★ A 'Packaged' Tale of Success-Failure

Outside software can be a cost-effective and practical solution to a variety of DP problems. See what other users have discovered in a Computerworld special report which begins on Page 27.

By Don Leavitt

Of the CW Staff

MINNEAPOLIS — Some users tell horror stories about attempted installations of packaged applications; others tell what amount to love stories on the same subject. Investors Diversified Services (IDS), a locally based conglomerate, can do both.

IDS has saved \$40,000 by acquiring a fixed-assets accounting package, rather than redeveloping its own system in-house. But the company has also spent untold amounts trying to bring up a payroll system the way it wants.

The success of the one implementation and the failure of the other are due as much to IDS's attitude and planning as to the vendors' software and support, according to Gordon Amoth, one of four programming managers at IDS.

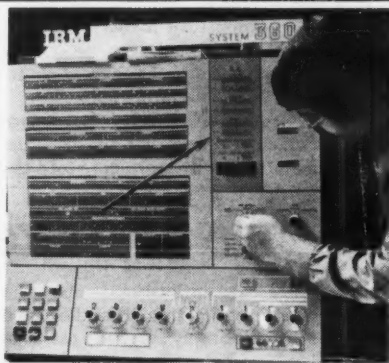
Since the payroll installation problems are due in part to IDS, Amoth felt it would be unfair to release the name of the package vendor. He also

said that, from now on, "if we're ever going to consider another system, but we're not satisfied with the way it is, we're not going to buy it."

IDS is a large DP user, including a 370/155, a 360/65 and a 360/30, as well as a 370/145 scheduled for delivery in April. It started with IBM 7074 and 1401 equipment and several of the applications are still run in emulation mode.

Amoth has a staff of 60 programmers and 15 "pure" systems people, writing much of the current programs in BAL.

A fixed-asset accounting system was developed in-house nine years ago
(Continued on Page 2)



CW Photo by Ronald A. Frank

Bill Vinson of Diversified Computer Applications adjusts 360/30 with first accelerator at Greyhound Computer Corp. The modified CPU includes the accelerator panel (arrow) with special indicators.

DP Foundation May Be Caught In Power Fight

By Alan Taylor

Special to Computerworld

CHICAGO — Control of the Computer Foundation project by the Association for Computing Machinery and the Data Processing Management Association — a situation which most concerned parties

Should the CDP exam be halted?
Story on Page 11.

wanted previously to prevent — is now becoming more and more apparent.

During the first meeting of the foundation's organizing committee, DPMA's John Swearingen, acting cochairman, overruled an attorney present, saying there was nothing in Robert's Rules which called for the election of a chairman. (Robert's Rules were selected by the cochairmen as the operating rules for the committee.) Swearingen emphasized that a chairman had the right to ignore the rulings of parliamentarians.

His own cochairmanship, Swearingen said, was one of the conditions upon which DPMA had agreed to set up the committee. He also warned committee members that DPMA was in no way obliged to go through with the anti-

Continued on Page 2)

Modified '360/37.5' Nears Model 40 in First Tests

By E. Drake Lundell Jr.

Of the CW Staff

SAN FRANCISCO — The first user with an accelerator installed on an IBM 360/30 reported that the device makes the unit perform almost like a 360/40 — and with the low 30 prices available the accelerator definitely makes the unit superior to a 40 on a price/performance basis.

Greyhound Computer has been using the accelerator manufactured by Computer Hardware Consultants and Services (CHCS) for over two weeks without a major problem, according to Paul LeClaire, production manager at the service bureau.

In benchmarks with the system, Greyhound found the accelerator improved the performance of jobs run by between 15% and 35% over the previous run times for the same jobs.

Greyhound selected the programs to be run randomly from the variety of programs available and used programs that were run regularly in the shop.

Memory Boosts Performance

In addition to the accelerator, Greyhound was also the first user to install a 256K memory box, also manufactured by CHCS, which had improved the performance of the system by between 10% and 15% previously, the user reported.

Together, the two enhancements for the 30 improved its performance by between 25% and 50% on sample programs, Grey-

hound claimed.

With this improvement in throughput, LeClaire said, the 360/30 is now performing just 10% slower than the Model 40 that sits beside it in the Greyhound shop here.

Before the accelerator was added, he noted, the 40 had performed 40% faster on the same benchmark tests when compared with the 30 with 256K but without the accelerator feature.

Another indication of how the accelerator has improved the 30's performance, LeClaire said, is that the 30 has been going idle almost every morning since the accelerator was installed.

"This means we are processing our overnight work faster with it than we were before. We're actually picking up two to three hours of processing time every night," he said.

Presently the system has 16K of IBM core and 242K supplied by CHCS, but LeClaire said the entire system could be speeded up if the firm went to all CHCS core, since it presently has to be slowed down to meet the slower IBM speeds.

In addition, he said, the accelerator is completely transparent to the users of the system, so much so that "a lot don't even know we have installed it yet."

The only difference is that their run times, and therefore their bills, are lower now, he said.

It only took eight hours to install the
(Continued on Page 2)

IBM Drops Sale of CPU Time

WHITE PLAINS, N.Y. — IBM has informed its customers that it will no longer provide hourly machine time at its data centers for production work.

CPU time at local IBM data centers will be restricted to "program testing and other activities, including conversion, directly related to program testing." These services will continue to be available to "users and prospective users of IBM products," the company said.

The withdrawal of machine time for production jobs at data centers "is in keeping with... the SBC/CDC settle-

ment in which IBM agreed not to engage in the data services business for six years," the spokesman said.

For existing data center customers the limited machine usage will become effective on May 6, 1973 while "for all others" it is effective immediately, an IBM spokesman said.

In emergency situations IBM data centers will provide CPU time as in the past. "If no other alternatives are available," in cases of natural disasters or other emergencies, the data centers will be available to users on a temporary basis, the spokesman said.

Who's in Charge?

Foundation in Power Fight?

(Continued from Page 1)

pated turnover of the Certificate in Data Processing program to the foundation on July 1, even if incorporation of the foundation is completed by then.

"If DPMA does not like the way things are going," he told the committee members, "they can just pick up their ball and refuse to play."

Swearingin's position was supported by the ACM-selected cochairman, John Harris. ACM also would not participate, Harris said, unless his appointment as co-chairman by ACM President Anthony Ralston was accepted by the committee.

He emphasized that the ACM Executive Council had approved the foundation project on the basis of specific documents, and that if the foundation was formed without being in accordance with these documents, ACM could withdraw from the project. "And," he continued, "it is ACM that DPMA has decided must be included in the foundation."

When the meeting got under way, after the Society of Certified Data Processors moved to accept the current leadership, the power struggle resurfaced at least twice, once jokingly, once substantially. Swearingin jovially announced the result of the only divided vote as having been "Lost, 2-9." In fact, the motion had passed with only ACM and DPMA voting against it.

More substantially, at the end of the meeting he announced that he would personally appoint the chairmen of all the subcommittees, although earlier he had said either the full organizing committee, or the subcommittees themselves, could

be used to elect these chairmen.

The organizing committee itself at this first meeting was comprised of 11 members, with the IEEE Computer Society and the Canadian Information Processing Society (Cips) joining, and the Association of Systems Management (ASM) withdrawing.

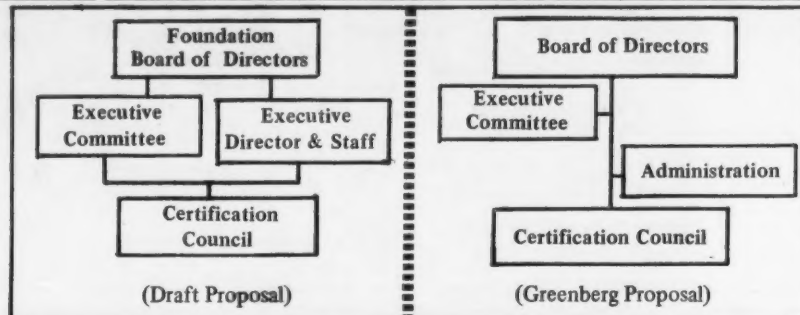
During the session four subcommittees suggested by SCDP's Marc Greenberg (program, organization, bylaws and finance) were adopted to handle the different operations of the organizing committee. Later, a public information subcommittee was added.

Financial matters regarding the proposed foundation were considered in two frameworks—one regarding the budget of the organizing committee itself, and one regarding the budgeting of the proposed foundation. Data Processors' treasurer Dale Holmberg had called attention to the short budget period used, suggesting that budgets for a five-year period should be prepared. This motion was passed after being supported by the Association of Computer Programmers and Analysts' representative George Eyke.

The full committee also agreed to release restrictions in the draft bylaws which prevented the member societies on the board of directors from being in full control of their operations, as a result of a constitutionally enforced delegation of their powers to an executive committee.

Cochairman Harris explained the drafts had been prepared quickly, and there had been no intention to restrict the power of the board of directors.

Holmberg reiterated his society's doubts



These are suggested versions of how the certification councils should perform the actual certification of DP practitioners. The draft proposal is included in the motion suggested by the ACM/DPMA committee. The other was proposed by Marc Greenberg, SCDP representative on the organizing committee. Greenberg argues that this version is necessary if the member societies are to always control the quality of certification council operations.

about the validity of the current CDP examination, and suggested the best plan might be to stop offering the examination until it could be shown as valuable in the data processing context.

"I think that DPMA moved too early toward certification," he said. "As a result, the foundation is now appearing to be more like a trade association operation than actual professional certification."

Getting News Out

The public information committee will be a two-way operation, presenting news of the Computer Foundation committee to the public, and also presenting information from the public to the organizing committee.

ACM's Harris asked that the public information committee prepare presentations which could be given to certain individuals who could be expected to provide funds for foundation activities.

Robert Sennet of Quality Data Processing, which is one of the smaller committee members of the project, told the

committee his society was offering public meetings immediately after the holding of the organizing committee meetings to publish news of the activities. The meetings would be on the first and second Fridays after each committee meeting, and would be held at Control Data Institute and Elkin Community College, both in the Chicago area.

Sennet was later nominated by the members of the organizing committee for the chairmen's consideration to head the public information committee. Other recommendations—none of which was opposed—were for Cole Furr to chair the program committee, Dale Holmberg the finance committee and Fred Harris the organizing committee.

The committees are expected to complete their prescribed work and report back by Saturday March 31, the date of the next full meeting. Meetings are open to the public, and the next meeting is planned in the Deltec offices, Chicago Aerospace Center Building.

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User Tells 'Packaged' Tale of Success, Failure

(Continued from Page 1)

when the corporation was smaller and less complex than it is today. The current multi-company structure and the mix of insurance companies, mutual funds, real estate and other operations could no longer be handled by the old system.

Amoth had all the documentation used including time spent when the original system was created. Based on that and what he wanted to add to the system, he felt he could estimate quite closely how much a home-grown resystematization would cost.

He considered several packages and selected one from Infonational, Inc., San Diego.

As part of the installation, Infonational wrote an interface to IDS's general ledger application, and modified the fixed-asset reports to meet IDS's needs. Essentially, however, IDS was able to use the system "off the shelf," and that saved the company \$40,000, Amoth said.

The payroll package vendor seemed equally willing to provide good support, but several of the updates on state tax calculations, according to Amoth, were "not completely checked out" before they were released. That has caused part of the problems IDS has had with the system.

The biggest part of the problem, however, has been IDS's unwillingness to use vendor X's input forms, which Amoth considers error-prone. Instead, IDS decided to write interface programs that would convert its own reporting forms into vendor X's prescribed format.

Meshing of the preexisting IDS forms and the new payroll package has not been completed, though IDS has been working on the project 14 months. Some IDS home-office people are being paid by a computerized system, but it is one carried over, in emulation mode on the 360/65, from the 7074 days.

While Amoth has had mixed experience with packaged applications, he is more positive about two other forms of software support he has had from outside

sources. He is enthusiastic about a custom-made application for IDS, and pleased with the way several packages have helped his DP staff in its own work.

Since 1952, IDS had been developing and using a graphic data base, particularly for stocks-and-bonds chartings, but the original flat-bed plotter was dying and the vendor was out of business. So the company looked around and finally hired AGT of Champaign, Ill., (and now part of Gould Inc.) to develop a hardware/software replacement system.

The file maintenance and plot generation programming exceeded Amoth's expectations: "I had no one in-house who could have touched that." And the specialized electrostatic plotter, working off-

line, moves fast enough to keep a 1,600 bit/in. tape going "flat out."

IDS has considered and used several utility packages to help its own DP staff work. The Panvalet librarian system, from Pansophic Systems Inc., went in easily although several data sets were lost in the early days of its use, when the operators did not fully understand the documentation provided by Pansophic.

Despite those slips, it has solved two basic problems. IDS has a library of some two million source statements and that meant, in Amoth's words, "there were a hell of a lot of tab cards" around the computer room up to a year-and-a-half ago.

Modified '360/37.5' Nears 40

(Continued from Page 1)

system at Greyhound, he added, but noted that was an atypical case. At Greyhound, a 360/30 that had been operating at CHCS in Pennsylvania was shipped to the site intact and the 30 was taken out.

In a more normal situation, he said, the installation of an accelerator on a 30 already installed would take a weekend, or its equivalent, according to CHCS.

LeClaire said that in the first week of operation the firm experienced three bugs with the new accelerator, all of which were minor and involved changes that had been made in the microprogram of the system by CHCS. They were all corrected quickly, and the firm did not experience any downtime because of them.

In the week since then, the system has been running 24 hours a day, he said, processing a wide range of user programs without a problem.

The 360/30 configuration with which the system has been running includes eight 2314 spindles, eight 2401 Model 2 and 3 tape drives, five 2311 spindles and a printer and card punch.

The accelerator completely obviates the need for the firm to upgrade to a

370/135, LeClaire indicated, and this also means the firm does not need to get another 360/40 to meet the same delivery schedules.

He also stressed that as a user he would like to see accelerators developed for both the 360/40 and 360/50, stating that such a device would make these systems extremely performance-competitive with the 370/145 and 370/155.

LeClaire suggested that the addition of the memory to the 256K size alone had made the system more effective on sorts and DOS software, but that it really did not perform at its best until the accelerator had been added.

Presently the firm is running under Grasp with two partitions on the 30, where it had only run one before.

The 30, which is jokingly being called the 37.5 at Greyhound, is maintained by CHCS and this practice will probably continue although the rest of the shop is maintained by Comma Corp.

LeClaire noted the IBM diagnostics for the 360/30 definitely would not run on a machine with the accelerator, but added that CHCS had developed its own diagnostics for the system.

Plaintiff Claims Rights Violated

Suit Would Halt Arrest Record Storage, Dispersion

By Alan Taylor

Special to Computerworld

BOSTON — The problem of whether or not arrest records should be stored or disseminated by computer systems moved closer to a solution this month when a disappointed applicant for a post office job filed a class action suit in Federal Court here against the FBI and Massachusetts authorities claiming such arrest record storage and dissemination was a breach of his constitutional rights.

The plaintiff's attorneys charged that the FBI, which stores arrest records in computerized systems, disseminated a record of his previous arrest to the Boston Post Office, and that he consequently has suffered permanent injury — i.e., being deprived of employment at the Post Office.

The case concerns the refusal by the Boston Post Office to employ John J. Leonard as a mail handler after he had been told he had been accepted, and was given a time and place to report.

The information in question concerned the fact that Leonard had been arrested in 1970 and charged with being in the company of persons using marijuana. The case was later dismissed.

Leonard's legal representative, the Boston Legal Assistance Project, claimed that during discussions with Post Office officials it discovered he was being rejected because the offense "was drug-related." Since Leonard had not been convicted of any offense, the attorneys argued that the refusal to hire deprives him of his constitutional rights including the right to due process.

The restriction sought on storage and dissemination of data is based on the claim that Leonard's arrest record was forwarded to the Post Office either by the FBI or by Massachusetts authorities.

Leonard himself was not asked about previous arrests when he applied for the position, only about "convictions for offenses other than parking violations," his attorneys said.

The brief claimed that the Post Office had no right to obtain the arrest information even from the applicant.

The main thrust of the case involves Post Office department procedures, which include a provision that a job applicant who is turned down three times can no longer be considered for appointment.

The argument is that while Leonard has

only been turned down once, and could presumably be compensated for this by payment of retroactive wages (from the day he was refused), he has been deprived of his rights on a permanent basis, because he is in danger of being deprived permanently of consideration for Post Office employment.

Case-by-Case Inquiry

The impact of the case, if successful for the plaintiff, could involve many more data processing operations than those of the FBI. There is no question being raised as to the accuracy of the data alleged to have been supplied — Leonard's arrest record — but the argument is that after Leonard's case had been dismissed this information should not have been supplied to the Post Office as relevant to the hiring process.

The case, if successful, could make it necessary for data base operators to

Getting a Job With a Conviction

A convicted felon can, under certain circumstances, get preference over a veteran once accused of a crime but not convicted — despite the Post Office policy of giving preference to veterans — when it comes to employment practices, according to the John Leonard brief.

This situation, the brief said, can result from the official Post Office policy of giving a second chance for employment to convicted felons, while

also rejecting a veteran such as Leonard because of a prior arrest record, but with no convictions.

Boston Post Office personnel official John Hannigan is quoted in the brief as having agreed that hypothetically this is the case.

In the actual case, however, the Post Office argued that veterans' privileges were not involved, since the position was given to another veteran after Leonard had been rejected.

inquire on a case-by-case basis into the use of the requested information before supplying data to organizations such as the Post Office or commercial firms.

Also, if the arguments in the suit are accepted fully, the fact that if such information is disseminated wrongly and

thus could violate one's constitutional rights would suffice to prevent even the information storage.

The suit is filed in the U.S. Federal Court in Boston, and spokesmen for the Post Office declined comment at this time.

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Medical Researchers Turn to Heart Study To Focus on Blindness

FRAMINGHAM, Mass. — Twenty years ago 5,000 residents here participated in a comprehensive computerized study of heart disease. Now medical researchers have returned for a research project into the causes of blindness.

The study, which will seek to identify factors which increase risk of eye disease and blindness, will utilize the hundreds of medical records compiled during the heart study. About 3,500 of the original 5,000 will participate in the eye study.

Dr. R. Thomas Dawber, director of the heart study and coordinator of the current project, said all subjects will undergo extensive eye examinations to determine the prevalence of eye disease in the population sample.

"This information will be fed into a computer and compared with other data we have," he said, "to see if we can determine under what circumstances eye diseases do or do not occur."

Researchers hope to uncover major factors leading to blindness in the same way the heart study identified high blood pressure, cigarette smoking and high cholesterol level as major risk factors in coronary disease.

Computer Caravan/73 Makes a Stop in D.C.

Reluctance to Change Inhibits Use of Distributed Data Entry

By E. Drake Lundell Jr.
Of the CW Staff

WASHINGTON, D.C. — Even though users are expressing a great deal of interest in a distributed data entry type of operation, at present there is a good deal of reluctance on the part of users to change their data entry operations, Geoffrey Thomas told a panel at the Computer Caravan/73 last week.

In addition, noted Thomas, of the Cost of Living Council, there are presently no real standards for the data entry area except for the punched card and standards will have to be developed before new data entry methods or ideas can fully take hold.

"Most of the equipment available today in the realm of new devices represents breakthroughs in technology," he admitted, "but there hasn't been much thinking about new data entry applications areas."

"We are," Thomas continued, "applying the latest in technology to first genera-

"As long as users keep the keypunch mentality, it will be impossible to go to more on-line data entry." — Geoffrey Thomas

tion ways of thinking. As long as users keep the keypunch mentality, it will be impossible to go to more on-line data entry.

"The challenge today is to design the distributed type of data entry system based around the current key-to-disk technology," he said, since this type of arrangement would be the most desirable for most users.

The panel agreed that users of data entry systems are looking for ways to move toward more distributed data entry operations without the expense of on-line data entry or intelligent terminals.

Even those discussing keypunch replacement or key-to-disk systems stressed the need for ways to distribute data entry operations over a wider geographic area than presently possible.

"What we need," one user said, "is a way to add communications capability to our key-to-disk systems."

"Possibly, we need a hierarchy of intelligence in data entry systems: a relatively unintelligent key-to-disk station at a remote site communicating with a more intelligent central key-to-disk site, and finally the higher level of intelligence

6,000 Attend Caravan/73

WASHINGTON, D.C. — Nearly 6,000 attended the first two stops of Caravan/73, according to show officials. An estimated 2,800 attendees made the show here in addition to the 3,112 in Boston.

The Caravan will take a week off before swinging into New York City on March 5-7 (Monday to Wednesday).

available with the central computer."

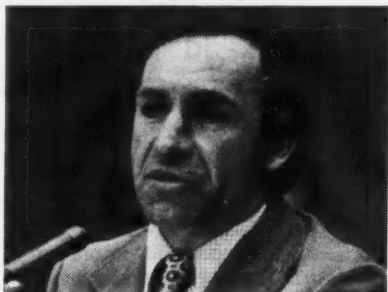
"Frankly, I was surprised at the user interest in distributed data entry," Thomas related.

"The users with key-to-disk systems are

Accuracy Is Intelligent Terminals' Chief Asset

WASHINGTON, D.C. — Accuracy is the most important benefit users can get through the use of intelligent terminals and this increased accuracy may outweigh every other factor in the selection of data entry equipment, users were told last week at a Computer Caravan/73 workshop here.

The use of intelligent terminals, according to Ed Neff and Craig Jester of American Trading and Production, allows a firm to place the data entry function in the hands of the people responsible for the



Neff

source documents and at the same time allows closer control over the data input to the system.

These terminals also allow a firm to use a small central processor in its network even if the data to be entered is large and the network extensive.

"A small computer like our System/3 Model 10 couldn't handle an on-line terminal system" without a major upgrade of the system, Jester said. Intelligent terminals allowed the firm to have the advantages of on-line entry in many respects without a large central processor, since most editing and error correction take place at the source of the transaction.

"We wanted to solve the error problem and the only way to do it was at the source," according to Neff. Under the old manual system used by the firm, he said, orders and shipment data were prepared on EAM equipment at three sites.

If an error was discovered when the documents got to the S/3 center, they would have to be returned to the center from which they originated. This process, from the date of the original document preparation to the correction process to the time the document was returned to the computer center and processed often took up to two months, he noted.

Intelligent terminals have reduced the time for order entry and invoicing to three days and keep the inventory up to date within two days.

The editing capabilities also permit the firm to have non-data processing-type people do the data entry function, Jester said.

Primarily, he said, the firm is using order entry clerks at the various sites for all of the data preparation and data entry functions, a move which allowed the firm to reduce the number of people at the outlying sites.

In all, this reduction in personnel has amounted to almost \$500,000 yearly, Jester indicated.

The capabilities of the terminal — a Sycor 340B — allow these order entry clerks to type information into the terminal in a familiar form since the program can call up familiar formats for their use and still format the data correctly for use by the computer, he indicated.

The editing and check capabilities of the terminal system have cut the firm's error rate by over 90%, he indicated.

The most important things the user needs to consider when selecting an intelligent terminal system, according to Jester and Neff, are service, expandability and the capability for unattended sending and receiving of data.



CW Photos by E. Drake Lundell Jr.

William Ziegler (middle), DP manager of Anne Arundel County, Md., addresses data entry panel while Geoffrey Thomas and Don DuVal look on.

very interested and the users who are only considering moving to key-to-disk also expressed a great deal of interest in being able to spread their data entry loads around," he said.

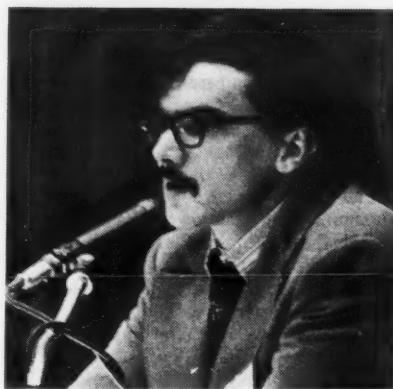
Some sort of distributed data entry, the users agreed, would offer some of the advantages of on-line entry, but would not require the expense of a large central processor and would not tie up the central processor.

However, the major disadvantage, according to the users, would be that the keystations in the field either would not have a great deal of editing capability or

that they would be very expensive with this capability.

At present, most of the users said, the key-to-disk systems available can fulfill present needs and allow users to perform their key entry jobs more efficiently than is possible with the keypunch systems they replace.

But, they stressed, it is time to start looking for new ways to apply the equipment that will meet the real user needs of the future. To do this, they said, the user community will have to "get it all together" and outline their real needs to the vendors of such equipment.



Jester

11 Commandments Of Vendor Selection

WASHINGTON, D.C. — Vendor evaluation is always hard, but becomes even more complex when the evaluation involves vendors of on-line data entry systems, Don DuVal of International Reservations Corp. claimed at Caravan/73 here last week.

To aid users considering on-line systems, DuVal offered 11 commandments of vendor selection:

- Allow enough time.
- Define your requirements before you talk to vendors.
- Establish standard definitions of desired features.
- Provide prospective vendors with written definitions of your requirements and problem areas.
- Don't exclude suggestions from vendors. Sometimes they know a better way.
- Determine vendor's track record — how many installed, were they on time, how about reliability; were reliability problems due to infant mortality or are they longstanding?
- In the case where you must buy a new and untried product, consider an independent engineering study.
- What kind of documentation can the vendor provide before you order?
- Consider the financial stability of the firm.
- What kind of delivery schedule can it provide?
- Get competent legal help with contract and conduct of relations after contract is signed. Don't wait until you are in trouble.

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Intensive User Survey 'Essential' to Terminal Selection

By Michael Weinstein
Of the CW Staff

BOSTON — Selection of terminals and modems should be based on a careful study of the user's operation long before any technical analysis of equipment is done, according to Emile Thibault, DP director of the Massachusetts Department of Public Safety.

To help users in the study Thibault suggested a proposal approach: first determine what the needs are and second find out what equipment satisfies those needs. "In preparing the proposal, survey all users who will enter data into the communications network. Determine what type of data is to be entered, how

much data, whether the user needs an interactive system or whether the data is to be stored for later batch processing," Thibault advised at a Caravan/73 workshop.

From this intensive user survey, the DP manager can then outline the specifications that the proposed communications terminals or modems must meet.

Using these specifications he should put out a proposal to all companies that have equipment designed to fill his needs.

The proposal now forces all vendors to respond in the same manner, Thibault said.

When all the proposals are in, the user is advised to make a matrix with the specifications on top and the vendors along the side. Users should evaluate each vendor by each specification and assign a number value — from one to 10 — to indicate how closely the vendor comes to meeting the pre-specified needs.

On features not so important the user may want to rate responses from one to five, Thibault added.

By adding up the numbers assigned to each vendor the user can then objectively evaluate each proposal.

To Mix or Not

Thibault advised users who choose multivendor systems to bring each vendor in one at a time and explain what is expected from him in the mix.

"Ask him at that time if he will have any problem maintaining his equipment with the other vendors' units also on the line."

Once all vendors state they can provide proper service, bring them all in to a group meeting — before any contracts are signed — and explain the ground rules of responsibility.

Once the user has determined what equipment will perform best for his application he should take one further step before signing the contract, Thibault said. Get a user list from each vendor under consideration and call a random selection asking about reliability, service and other potential problems.

He also suggested that users call large installations and time-sharing companies to ask their advice on technical questions, as these firms have internal experts.

Other marginal considerations he suggested were to show preference to a local company since the service and access to experts would be better.

For the small and inexperienced user, Thibault advised staying away from new products that had not been field-tested.

The dangers of equipment failure for the small user outweigh the potential cost savings in most cases, he noted.

N.J. Colleges Get DP Agency

TRENTON, N.J. — The New Jersey state Board of Higher Education recently moved to centralize computer usage by institutes of higher education through the establishment of a public corporation.

The new agency, Educational Information Systems, Inc., is expected to facilitate computer access by the state's small colleges, public and private, which cannot afford their own DP equipment.

5 Firms Share Cost Of Personnel Training

By Toni Wiseman

Special to Computerworld

BOSTON — Pooling of resources in personnel training can be a practical and cost-effective solution to the problems faced by the DP departments of small companies.

Worcester County National Bank's training program is a user group approach in which five companies, including an insurance company and major manufacturers, participate under a formal contract.

The course materials are chosen collectively, according to Paul F. Ladd, programming manager at WCNB, but each company reviews each course and decides whether or not it wants to participate. Each can participate in as many or as few as it wishes, explained Ladd at a Caravan/73 workshop on personnel selection and training.

The cost of each video-assisted course, bought as a package from a vendor, is then prorated. The total cash outlay over the past couple of years, according to Ladd, has been an average of \$6,000/company, or only about \$30/person/course.

The objectives of the program, he said, are threefold: to keep good personnel by means of career path training; to help personnel by increasing their knowledge, and thus their potential contribution to the company; and to motivate them.

"This sort of thing works. We've been doing it for three years, and the more we use it, the more we want to use it," he concluded.

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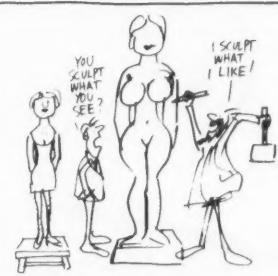
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Cybernetics Helps Chileans Keep Watch on Industry

By Joseph Hanlon

Special to Computerworld

SANTIAGO, Chile — An extensive computer system which gives factory managers and government officials a daily, up-to-date picture of the nation's industry recently began operations here.

The system is probably the most advanced use of cybernetics and operations research in management, according to the system's designer, Stafford Beer, a British cyberneticist and management consultant.

Data from factories all over the country is sent daily by special Telex and microwave links to the computer center here, where it is analyzed for significant deviations from normal and reports made to factory managers and government officials.

How It Started

The project first began in late 1971. Teams of scientists built "crude but effective" cybernetic computer models of each factory, each sector of the economy (such as textiles), and each of the four branches in Chile's economy (light, heavy, materials, and consumer), Beer explained.

Branch models draw their data from sector models, and sector models from individual factory models. The models themselves are simple. Factory models typically depend on 10 critical numbers — usually supplies, output, absenteeism, and measures of certain critical processes likely to lead to bottlenecks. Each of the critical numbers is sent to the central computer every day.

So far, only 40% of nationalized industry has been tied into the system, which in turn is 60% of the economy as a whole. But even when the system is completed in three years, there are likely to be fewer than 500 factories tied in, which means that the total daily input will be less than 5,000 number/day.

The system uses two medium-size com-

puters, an IBM 360/50 and a Burroughs 3500. Data is not entered automatically, but by keypunching based on the daily Telex reports.

Sophisticated statistical routines analyze each input number each day and give the probability that a change is significant and not merely random fluctuation. The program, called Cyberstride, "is incredibly sensitive to these changes, recognizing them long before the human brain would dare to make a judgment," Beer said.

Only What Is Important

Filtering systems select only the important information so that people are not overloaded with data, Beer said, in contrast to traditional management information systems. A factory manager would be unlikely to get more than one exception report a week.

Accordingly, branch and sector managers receive only selected reports. For example, an increase in absenteeism at a less important factory would generate an exception report only for the manager of that factory, while increased absenteeism at a particularly critical factory or increases at several factories would generate an exception report for the sector chairman. But the computer also gives the factory managers a time limit; if he does not solve the problem within the specified time, the computer automatically informs the sector chairman.

Real-Time Nervous System

According to Beer, delay in receiving economic information is a primary cause of bad policies. Many firms, for example, do not even know they are going bankrupt.

Governments generally act on data six months to a year out of date, and thus often do exactly the wrong thing to the economy. What is required, Beer declared, is a "real-time nervous system of

the economy."

The power of the Chilean system is best illustrated by a recent "bosses' strike," when owners of transport companies nearly brought the country to a halt. Using data from the special communications system and computer simulations, Chilean leaders had an instantaneous picture of the strike and were able to select the best strategy to break the strike.

In Chile, all of the critical information is completely up to date and available in a central "operations room" in Santiago.

Also available in the operations room is a suite of simulation programs, which permit planners to test out alternative strategies for investment, distribution of critical materials, etc. These programs are similar to those used regularly in industry, but Beer argues they are more effective here because they make use of up-to-date information and of the cybernetic models of the economy that are already in use in other parts of the system.

The operations room and the simulations were used, for example, to plan an

expansion of what Chile calls "white line," that is, refrigerators and washers.

Bigger and Better

Three tasks remain for Beer and his team. First, the system must be expanded to the entire economy and the simulation software must be considerably extended.

Second, because the system was only recently introduced to the public it is not widely used or understood by managers. Thus, the team must now convince managers to use the exception reports. The system is designed to take considerably more data, and managers will be encouraged to select additional indicators that they consider important.

Finally, Beer is working on a feedback system for the peasants and workers of Chile. He declined to give details of the feedback, but suggested that it will be linked to TV sets so viewers can respond immediately to a program, with the central computer summing up the collective opinion.

News Wrapup

FAA Ends Phase One Of Air Control Plan

WASHINGTON, D.C. — The Federal Aviation Administration has completed the first phase of its air route control center automation program with the changeover at the Memphis center to computer processing of flight plan data, Secretary of Transportation Claude S. Brinegar announced.

Memphis was the last of the 20 centers to achieve this capability using IBM 9020 computers.

All 20 centers now are tied together in a nationwide computer network which permits automatic transfer of flight data from one facility to another. This enroute system will also transfer flight data automatically with the 61 Automated Radar Terminal Systems (ARTS III).

This first phase of the enroute program primarily automates the major bookkeeping functions within the center, such as calculating and distributing aircraft position data to the controllers. It also turns over to the computer the tasks of receiving and processing flight plans from the users of the control system and transfers appropriate data to other centers or airport terminals as the flight progresses.

"Phase Two will provide automatic display of such flight information as radar position, aircraft identity and altitude data," he added. "Phase Two hardware has already been delivered to four centers with the first installation at the Los Angeles center scheduled for initial operation this summer. Target date for completion of Phase Two at all 20 centers is 1975."

Citizens Access Canada's Population Statistics

OTTAWA, Ontario — Statistics Canada's new geocoding system will provide the ordinary citizen with census data at the push of a button. The user may access information for any part of Canada down to an area as small as a few blocks along one side of a street.

Geocoding — the Geographical Referenced Data Storage and Retrieval System — can provide detailed breakdowns of age, sex, marital status, mother tongue, land classification and whether property is owned or rented. The system is expected to be helpful for planning educational systems, social services and other government responsibilities, as well as commercial enterprises.

Antoine Terjanian, head of the geocoding group, stated: "We won't give a one-block reading because we have to assure

people that census data, on an individual basis, is kept strictly confidential data. And the information from one block on one street side gets too close."

Users' fees begin at a basic \$14, with additions for populations covered and an extra \$4 for every variable required.

Applications are handled by the Census Users' Inquiry Service in Ottawa; initial inquiries are accepted by regional Statistics Canada offices.

Doctor Proposes Data Base Of Defects Found at Birth

EDMONTON, Alta. — A doctor from the University of Washington has suggested that genetic defects be tested and recorded in a data base at birth.

Speaking at a meeting of the Royal College of Physicians and Surgeons here, Dr. Arno Motulsky said a gene profile could be drawn from blood tests and any defective genes recorded on punch cards. Then when a couple decides to get married they will know what defective genes they carry and what the risk is of producing defective children.

So far doctors understand 100 diseases which are caused by defective genes, Motulsky said. Some are known to occur only if both parents carry the same gene defect.

Sealskin Transactions Sealed By Minicomputer

GREENVILLE, S.C. — Sealskin auctioning has taken on a new twist.

Buyers from around the world who gather here twice a year to bid for various lots of seal skins found the most recent auction distinguished by the presence of a computer which was used to track the transactions.

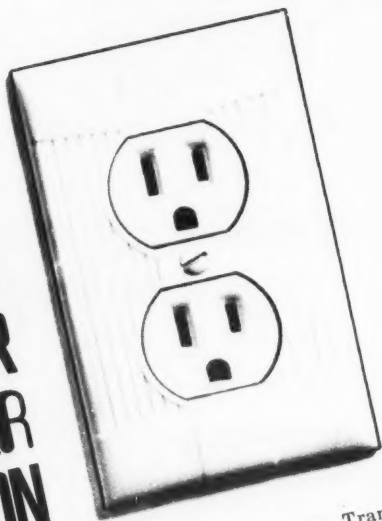
The Fouke Co., which auctions off the sealskins, hauled a small computer eight miles by truck and installed it at the Greenville Auditorium, just a few steps from the auction floor. The computer, as it captured each sale, also analyzed sale trends, giving Fouke an accurate projection of the auction's outcome.

A ledger card was prepared on each buyer and was updated as sales progressed. At the close of the auction, the unit automatically produced detailed statements which were sent to buyers the next day.

The computer also generated shipping instructions for airlines and other shippers and ran a complex final analysis of the complete auction.

In the past, it took days and sometimes weeks to process all the transactions made at the auction.

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Attention: Michael J. Creedon
Executive Vice-President



Firm Solves Weighty Problem

EL MONTE, Calif. — How can a large sand and gravel producer load, weigh, dispatch, deliver and bill 1,000 truck loads per day, at a rate of better than a truck per minute?

Livingston-Graham, Inc., with 19 plants in Southern California, uses a minicomputer-based system to do it.

The mini manages the data file and two CRT displays to help the dispatcher decide what load each incoming truck should take and where it should go. Trucks are weighed automatically and the minicomputer records the scale readout. The mini calculates net load weight and product cost, then prints the bill of lading.

The Data General Nova 1200-based system, developed by Sierra Data Systems, has 12K of core memory, two 70-foot platform truck scales, interface, CRT keyboard, disk, printer and TTY.

Before installing the computer, Livingston-Graham relied on the dispatcher to correctly time the flow of material to each customer job site. If delivery was too fast, trucks were kept waiting at the site, an expensive delay for the firm.

Now, the dispatcher gives the truck driver a customer order that tells him what kind of material to pick up. He enters information such as truck and job number and material code on the CRT. The truck driver picks up the material in the yard and stops on the scales to check the load limit.

In less than 10 seconds, a delivery ticket is printed with such information as customer name, date, material description, time, address, truck and job number, tons already shipped to the job, tons remaining to be shipped and gross and net tonnage on the truck.

Other benefits of the new system are complete billing data, truck use statistics, driver performance reports and elimination of the highway patrol fines for excess load limits.

For Want of a Cloth (and Backup) There Was Confusion at Airport

By Joseph Hanlon

Special to Computerworld

LONDON — Hundreds of passengers queued for the wrong planes, and some even missed their flights, because a new computer system here was tested without proper safeguards and no manual override system existed.

The problem occurred at Heathrow Airport in January in the international terminal, where a massive \$1.2 million computerized indicator board system is nearing completion after four years of work. The computer drives more than 100 displays for departures, arrivals, baggage pick-up, etc. Some of the displays are simple CRTs, but many are mechanical.

The system is being phased in slowly over two years, so parts of it are already in use during the day and other parts are tested late at night.

Testing is done with a typical schedule composed of real flights, but with de-

parture gates assigned arbitrarily.

The difficulty is that only the computer can change the huge mechanical departure display boards — there is no manual erasure system and no set procedure to simply throw a cloth over the board in the event of a power failure. Instead, in case of emergency there is a special sign which can be lit up to say "please disregard this information."

On the day of the mixup, in early morning, the engineers were working on the departure board system, and were testing restart procedures after a power failure. The system failed to restart, leaving the typical schedule on the departure boards. Recovery did not occur until 10 a.m. that morning when thousands of passengers were already in the terminal.

In the international terminal, many passengers could not read English and did not understand the "please disregard" signs; loudspeaker announcements were lost in the confusion. Many passengers believed the departure boards and queued for the wrong planes. Yet the whole problem could have been eased simply with a cloth thrown over the signs.

The indicator board system uses two Honeywell 316 computers with 80K of disk storage to keep an entire week's 1,300 flights on the computer. Four input terminals permit changes and special flights to be added.

Philip Rawson, the British Airports Authority senior engineer in charge of implementing the system, said most of the system is already in use and only the departure board subsystem remains to be completed.

No Standby

The computer system does not have standby power, but its emergency shut-down procedures are designed to keep all data intact in case of power failure. After a simple restart procedure, it should be able to pick up where it left off.

In this particular case, the engineers cut power and when they turned it on again, they could not restart the system. Rawson explained the difficulty was later traced to an "intermittent disk fault," now corrected.

The departure boards are 40 feet long and 5 feet high and list destination, airline, flight number and departure time and gate for up to 50 flights. The boards are called flap indicator boards because each space on the board has its own motorized drum with 40 flaps containing the alphabet and numbers to spell out the required information.

Rand Aims Research At Systems Aspects Of Data Bank Systems

SANTA MONICA, Calif. — The main thrust of research in privacy and security of data bank systems at Rand Corp. is presently toward data security engineering, according to Rein Turn, principal investigator at Rand.

By this, the investigator at the think tank said, the organization is trying to find a systematic way of describing a system that takes into account the value of the data and to develop some method to measure the security of the system based upon the value of that data.

Many Sidelights

In doing this, the hardware and software are not the only considerations in the equation, he indicated, noting "people can give away anything" if they want to and have the access.

What is needed, he said, is some method to determine the trade-offs between the cost of protecting a system and the value of the data in a system.

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Editorials

'Tooting Our Horn'

The Computer Caravan/73 has been launched on what promises to be a second successful year of operation.

With more than 300 products on display by 52 firms in 68 booths the exhibit floor offers users demonstrations of the types of equipment they need from data entry through minicomputers, communications gear and memory devices, to output equipment.

It's worth the \$5 admission price which lets the user visit the exposition for three days.

The proven forum format with users discussing user-oriented problems in panels and workshops provides insights into improving day-to-day operations in such areas as software, data entry, data communications and installation management.

So even if it sounds like we are "tooting our own horn," we think the Caravan can be a useful tool for any user — whether he can only visit the exhibit floor or can participate in the workshops and panels.

The Peripheral Issues

It will take some time to adequately assess the impact of the IBM/CDC agreement on the DP industry. But some of the peripheral issues may far overshadow the actual agreement.

Telex has charged the wanton destruction of a data base. This is a very serious charge.

An antitrust case seeks to prevent business practices that are against the public interest. Does it not follow that data (an index) associated with such a proceeding affects the public interest?

Who will decide when a data base becomes a device that affects the public at large? And, more importantly, how will the public's right to preserve such data bases be enforced?

We hope these issues will not be lost in the specifics of the case at hand.

Windows on the World

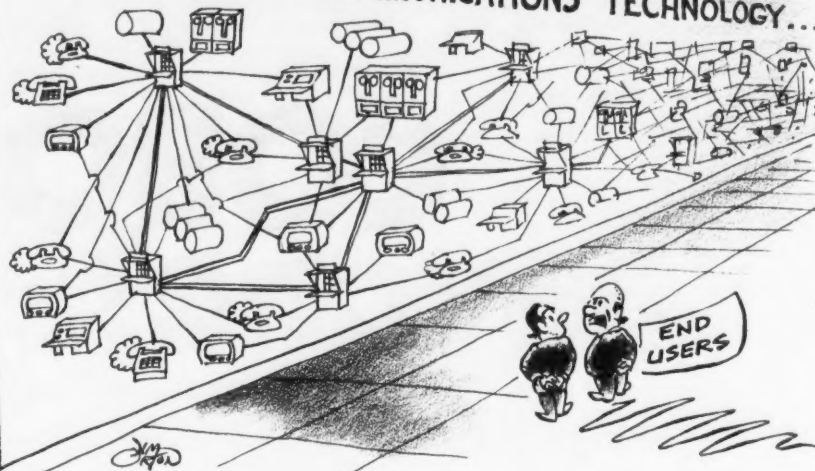
The launching of *Shukan Computer*, *Computerworld's* new sister publication in Japan, is of more than passing importance to CW readers. It represents a major first step toward our goal of increasing our worldwide news-gathering resources.

Japan has one of the most active computer communities in the world. This community represents not only a market for U.S. DP products and services but a wealth of user experience that can be shared by U.S. users.

One of CW's major objectives has been to provide users with up-to-date information that may help them avoid mistakes and "reinventing the wheel." DP is now a worldwide industry, making it imperative for users to keep up not only with what is going on in the U.S. but elsewhere in the world.

CW intends to provide its readers with more of this information in the future via *Shukan Computer* and other international affiliations.

EXPANDING COMMUNICATIONS TECHNOLOGY...



'It Includes Everything Except Us'

Letters to the Editor

Source Document Area Inhibits Use of COM

I have read with interest the article on COM trade-offs [CW, Jan. 17] and while I generally agree with the article there are other points I'd like to make.

The use of high reduction ratios does permit greater packing density but as in all photography the small image size complicates all phases of the operation from exposure to duplication.

Many EDP managers look upon their COM print units as replacements for line printers when in reality COM printers, limited though their capabilities may be, open vistas in the realm of data storage and retrieval that previously defied efforts limited by impact printers. This limitation was particularly severe where multiple copy requirements were large.

In the duplication area diazo is very much alive and several companies have solved the ammonia dumping problem. I find the addition of sizable quantities of citric acid to the water to absorb excess ammonia completely, eliminates the ammonia odor and if alkalinity indicators are used to signal when the absorber is depleted, ammonia ceases to be a problem.

COM is currently inhibited by two major factors — one of these takes the form of unenlightened EDP managers, the other and most serious, is the limitation imposed by forcing COM to operate in a source document environment. Education is the obvious answer to both of these problems.

Al Aron
President

Computer Micrographics
Technology
Los Angeles, Calif.

The Silent Majority Speaks for the Giant

Speaking from 20 years of significant data processing experience that has produced results in terms of reduced costs and improved services, I desire to add my views to what I be-

lieve is a silent majority in favor of and in defense of IBM.

I suggest this is not the time to freeze success, but to cast off the cling-alongs. Let both successes and failures take their natural courses.

The computer people need to remain free in their continuous quest to improve the production and delivery of relevant information directly to decision makers.

Charles E. Emswiler, Jr.
Information Systems
Administrator
Virginia Division of
Motor Vehicles
Richmond, Va.

IBM Has the Right To Protect Itself

IBM — like every giant successful corporation — did not become a giant overnight. IBM has come of age through skillful application of managerial techniques employed by Thomas J. Watson and his staff.

IBM, historically, has caused the U.S. computer industry to grow in five-year leaps with the advent of the System/360 in 1965 and the System/370 in the 1970s. Millions of dollars were spent in the researching, designing, developing and marketing of these sophisticated systems.

In the late 1960s and early 1970s parasitic competition had swiped about 10% of IBM's installed equipment base. Customers were replacing IBM's own 360s with the same models under third-party leasing agreements. Third party lessors can afford to lease at a cheaper rate, because they provided none of the effort that goes with the manufacturing of a computer.

So IBM developed the 370/135 and 370/145 with virtual memory capability and will install it free of charge for its customers, but did not include these features in the 155 and 165. If these facts are true, then IBM did not and does not intend to take a swipe at its customers, but at the competition it considers parasitic.

The independents who were reducing IBM's profits with their

"add-on" memories also got what they desired. IBM developed a new combined disk and controller (3333) which handles twice as many 3330 dual-spindle drives as the 3830 I. It's cheaper for the customers, but prevents competitors from attaching their disk subsystems to installed IBM systems.

Is the Department of Justice directing its efforts in the right direction? Perhaps if there were stronger legislation preventing parasitic competition of this nature, then IBM would not have to resort to these tactics to "Protect itself."

Johnnie R. Jackson
Chief, Data Processing

Walter Reed Army
Medical Center
Silver Spring, Md.

In Praise of IBM

Just a note on Wesley T. Saville's "Keep IBM Together" in the Feb. 14 issue.

It's a pleasure to see that *Computerworld* is — if only occasionally — willing to discuss IBM's virtues, as well as its alleged vices. As a satisfied IBM customer, and one who has "shopped around," I believe IBM has achieved its leadership by offering users what they want at prices they are willing to pay.

Jay Morrill
Executive Vice-President
Lyal Electric, Inc.
Albion, Ind.

Card Program Wanted

A number of years ago, a friend of mine had a two or three card 80-80 reproduce program for a 1401 system. A control card, which followed the program cards, was punched with a "#" in every column to be produced, a blank punched in every column to be omitted, and the actual character punched in the column to be gang-punched, if gang-punching was desired.

I am wondering if any readers have a program similar to this program that would work on a 360/20 with an MFCM.

Anton J. Wall
Data Processing Supervisor
Sioux Valley Empire
Electric Association, Inc.
Colman, S.D. 57017

Outside Evaluation Possible Should CDP Exam Be Suspended?

The first meeting of the Computer Foundation Organizing Committee last March was not all brightness. But it was not all dark either. In fact, the spirit of the meeting showed that a large number of disparate societies were prepared to work together toward the goal of certification, and were prepared to provide substantial funds to support it.

Representatives disagreed with each other and then moved on to the next item without harboring bad feelings. Simply a common devotion to bringing professionalism to the field and a hearty understanding of the frailties of computers.

Yet one question was raised which was given much less attention than it deserved. L. Dale Holmberg, representing the Soci-

ety of Professional Data Processors (SPDP), asked that we consider halting the CDP program. The result was a stunned silence, followed by a change of the subject.

Holmberg's arguments were really simple. The DPMA, he felt, had gone ahead with the program too early for a professional certification operation. At the time, he claimed, there was too little known about just what the operation really needed to be professional. Instead, he opined, the program looked more like something a trade association might put together.

What Holmberg wanted was not to discard the CDP program completely, but simply to halt it until it is clear it does what it professes to do. Holmberg, himself a CDP, said he did not believe that such evidence was currently available.

And Holmberg was quite right. The CDP program is both controlled and evaluated by a single group of people—the DPMA Certification Council. It, in effect, sits in judgment upon its own work, and the general pub-

lic is expected to rely entirely upon its judgment. A practicing data processing manager, Bruce Taylor, told me he simply is not convinced by this type of evidence, and I can't say I blame him.

It is not a case where Taylor does not believe in certification as such. He certainly does believe in it and feels that there is a real need for it in data processing. His current disquiet, like Holmberg's, arises from CDP examination process.

Unlike Holmberg, however, Taylor has some positive ideas as to what type of evaluation procedures would help. This is natural, for he is the data processing director of services for a national educational service—the Educational Testing Service (ETS) of Princeton, N.J.

ETS, at the suggestion of Holmberg, has actually looked into the possibility of providing a CDP examination which would be independently evaluated and which could be economically run. Dr. Albert Maslow, who is involved in designing tests of this nature, and who is no stranger to data processing problems, has done a rough design of such an operation.

He suggested that each separate area—programming, management, etc.—have its own task force. (The societies would be responsible for providing this help). The work of each task force would be evaluated by ETS and reported if necessary to the full board of directors of the foundation. After the examination would come the final studies.

At the same time, Maslow said, a continuing evaluation of the whole examination with regard to need and effectiveness could

What Are Your Views on CDP Exam?

It has been suggested that the CDP program be halted until it has been shown that the examination is performing properly. Such an evaluation is currently being conducted by the DPMA Certification Council, which also is responsible for the examination itself. The Computer Foundation draft constitution suggests that this council be the model for all foundation practitioner certification activities (including business programming, operations research, etc.).

Dr. Albert Maslow of the Educational Testing Service suggested it would be possible for his own operations, or a competitive one (such as the Measurement Research Center, Iowa City) to provide for both a continuation of the examination and a parallel independent evaluation.

There are therefore three alternatives—continue as is (recommended in organization committee plans), halt the exam until it is proven effective or begin outside evaluation.

Please check the alternative you favor and explain why.

☐ Continue as is ☐ Halt until proven

☐ Begin outside evaluation

Why?

Name _____ Professional Position _____

Address _____ Society Memberships _____

If interested in any society please circle: SPDP SDE

Acpa SCDP Other _____

After completion please return to Computer Foundation Public Information Subcommittee (CFPIS) c/o Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

be conducted. All could be financed well within current CDP limits, Maslow said, provided that the societies which specialize in each area can and will produce the working task forces.

The organizing committee itself is clear evidence that such resources are available for these purposes. Already there are 11 societies ready to pool their resources. So the idea is practical.

Currently, the organizing committee has not adopted it. I think it should. I think the CDP, and professional certification in general, is too important to leave to the self-evaluation methods currently being used in the DPMA Certification Council (which is itself a partly appointed, partly self-perpetuating body).

I think the organizing commit-

tee should know the reader's views. There is an official way to express your views. The Public Information Subcommittee has been established; the acting chairman is Robert Sennet, and he can be reached at Quality Data Processing, 709 Ridge Circle, Streamwood, Ill. 60103.

Alternatively, there is a coupon with this article.

Whichever way you choose, your opinions will reach the organizing committee. And your opinions are important to the whole matter of certification.

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The Taylor Report

By
Alan Taylor, CDP



Foundation Has Two Strikes

The prospect of many certification programs for data processors under a single roof with all the supporting societies having an equal voice was an attractive idea when it was presented publicly last year by DPMA. It was particularly attractive since three of the large societies were connected with the proposal; ACM and DPMA backed it, while ASM had at least an observer working on the committee.

Accordingly, this column welcomed the concept.

Since then, things have changed. ASM has now withdrawn from the operation, leaving just ACM and DPMA. And the participation of these societies is turning out to have a larger price tag than they revealed when they presented what they claimed to be "full" information in January.

At that time the price tag was set at \$8,500. This was the sum provided for the organizing committee staff and office. The \$8,500 was needed from the other societies, it was claimed, because it was necessary for everyone to realize that ACM and DPMA were not controlling the organizing committee.

Accordingly, it would be improper for the organizing committee to make use of the available ACM or DPMA staff, room or duplicating facilities. Former ACM President Walter Carlson made it clear that he felt any such use of DPMA or ACM facilities would hurt the project seriously by suggesting ACM/DPMA control.

The reality, as revealed at the first meeting of the organizing committee, is that the real price tag for ACM/DPMA participation is for the other societies to conceal from the public the real extent to which ACM and DPMA control the foundation (see Page 1 story).

The full price tag is not yet known. But a claim was made that ACM President Anthony Ralston appointed a cochairman to an officially independent committee, and the DPMA cochairman was given the right to prevent alternative nominations for committee officers from being entertained at the first committee meeting. These events show that the amount of actual ACM/DPMA control is significant.

As Carlson said, such control hurts the foundation's chances of success. ACM/DPMA control must be considered as one strike against the foundation.

However, the concealment of this control is something else. If ACM and DPMA had come out openly and said they were insisting upon appointing the officers, and were not prepared to have the officers' powers designated by the organizing committee there might still have been some cooperation from the community. Both societies have a great fund of community good will which might have carried them over this hurdle.

But no amount of good will can carry them over the present situation. The retention of control is unfortunate, but its attempted concealment is unforgivable.

The concealment is a second strike against the foundation. Now it only has one strike left.

I still support the concepts behind the foundation. I will welcome a genuine attempt to implement DPMA's Certification Program Advisory Committee's report. I await hearing from ACM and DPMA as to whether—and how precisely—the report will, in reality, be implemented.

Upon their actions lies the fate of the game.

Letters to the Editor

Managers Must Realize Resources Are Human

Frank Greenwood talks like a manager, without making any sense! The problem with any management and any organization is that they espouse and follow these compartmentalized credos which totally ignore the fact that the resources with which they are dealing—people—are individual social entities.

Anyone who has read Weinberg's *Psychology of Computer Programming* knows these management guidelines are like all the organizational diagrams—so much hot air and used toilet paper.

Michael Vrilinear
San Diego, Calif.

Government Control Would Reduce Quality

How many people are being paid to uncover what they think is embarrassing information about IBM. The front page article in the Feb. 14 issue is an instant replay of *Computerworld* and many other periodicals of late: how dare IBM take such advantage of the consumer in order to make money.

The last corporate directive I heard from any IBM customer was not: "they made me buy it." If customers are willing to sacrifice their dollars and corporate free will to choose another vendor, then there can be no complaints about IBM's profit margins.

And anyone who thinks that government control will reduce prices is dreaming. What will result is an inferior product for a not so reduced price. The original objective of the anti-monopoly legislation was to provide a better product at a competitive price to the consumer.

Robert J. King
Manchester, Conn.

How Would You Like To Be Research Rat?

An article in the Jan. 17 *Computerworld* concerning experiments to increase the learning speed of rats by feeding them the brains of learned rats, brings to mind a similar experiment in an isolated area of East Dakota where a two-century research project is nearing completion.

Fledgling rat researchers were fed the brains of older experienced rat researchers in an attempt to save the lives of future

research rats by bringing rat research to a speedy conclusion.

The latest group of rat researchers achieves its full potential after 10 years, in contrast to rat researchers fed no brains, who mature after 30 years. The company is now offering job contracts of 10-year's duration.

R. Fink
Boston, Mass.

Logically Speaking Are We Professionals?

I must take exception to Joseph T. Rigo's letter [CW, Jan. 24]. Rigo assumes the prospective employer realizes with certainty that he is addressing a "brilliant young computer professional" whenever he is interviewing same. I wonder, if "brilliant young computer professionals" wear a lodge pin that indicates their exalted status.

I would hope that in the future, both defenders and deriders of certification would couch their arguments more logically. It was my understanding that logic is the reason for our "professional" existence.

Stephen M. Rush, CDP
Special Systems Consultant
Honeywell Information Systems
Willowdale, Ont.



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Random Notes

APL Conference at Goddard Cancelled In Budget Bind

GREENBELT, Md. — The APL Conference, previously scheduled for March 12, 13 and 14 at Goddard Space Flight Center [CW, Dec. 6] has been cancelled by the National Aeronautics and Space Administration (Nasa). Submitted papers are being returned to the authors, Nasa said, so they can be presented at other meetings.

A terse announcement from Nasa "regretted" the demise of the annual meeting but said it was necessary "in view of the current stringent manpower and budget limitations."

OS Unneeded for Disk Support Using 'Stand Alone Restore'

FLANDERS, N.J. — OS and OS/VS users can dump and restore their 2314 or 3330 disk files even if their system packs are disabled, with the Fast Dump Restore-Stand Alone Restore (FDR-SAR), self-loading bootstrap program from Innovation Data Processing.

The normal FDR package may be purchased for \$990. FDR-SAR may be obtained free by all existing FDR users and all who purchase FDR before May 1. After that, FDR-SAR will cost \$100, an Innovation source said. The firm can be reached through P.O. Drawer F, 07836.

Datapoint 2200 Gains DOS

SAN ANTONIO — Datapoint 2200 users gain more flexible capabilities with the Disk Operating System developed for the 2.4 Mbyte cartridge disk that is optionally available with the 2200. The DOS provides file management including the prevention of overrunning previously established files.

The Datapoint DOS also supports linkage, overlaying, interrupt handling, a library of subroutines and a dynamic debugging facility. An enhanced version of a high-level-language, Databus 7, runs under DOS and allows coding with Cobol-like instructions.

Datapoint Corp. (formerly Computer Terminal Corp.) is at 9725 Datapoint Drive, 78284.

Centurex Adds New Offices

LOS ANGELES — Centurex Corp., formerly Systems Associates Inc., has opened new sales offices to serve the banking industry in Pennsylvania, Illinois and Georgia.

The Georgia office is at 6065 Roswell Road N.E., Atlanta, 30328. The facility in Illinois is at 800 Enterprise Drive, Oak Brook, 60521, while the new Pennsylvania operation is in Dublin Hall, at 1770 Walton Road, Blue Bell, 19422.

Centurex is headquartered at 5959 W. Century Blvd., Los Angeles, 90045.

With Data Base Texts

Users Face Choice: Think or Skim

By Don Leavitt
Of the CW Staff

What is a data base management system and what can it do for me?

Users who want an answer to that question now have two new references to consider. The choice depends on how deeply they want to get into the subject and how much they want to spend.

The latest *Casebook*, distributed free by ADL Systems Inc., provides an overview of the subject, especially for senior executives interested but not actively involved in computer systems and software development.

In contrast, detailed descriptions of the elements that make up a data base management system are provided in a research study to be published shortly by Q.E.D. Information Sciences Inc. This report approaches the depth of the reports put out two years ago by the Data Base Task Group of Codasyl's Programming Language Committee, but Q.E.D. anticipates updating its work to keep it current.

Q.E.D. also goes further than the Codasyl effort by attempting to rate four of the most commonly available systems, point-by-point, so that users have an objective way of knowing which might be best for their particular requirements.

Not for Small Users

The *Casebook* "primer" notes that data base systems can be a major help to users with large file management and updating problems, high demand for one-time accesses and a large volume of changing retrieval needs. But they are "probably not a viable approach," the pamphlet warns, for the small-scale user or for an initial implementation effort.

During selection, the ADL publication said, users should weigh three areas within their own design requirements: com-

plexity of the proposed data base, type of inquiry capability desired and anticipated response time. Most systems are biased toward just one or two of these, and the user has to consider the trade-offs.

The 200-page Q.E.D. report starts on the same basic ground but gets into much more detail. Q.E.D. sets its evaluation criteria on data manipulation, query capabilities and application programming, then on physical files, communications and installation requirements.

Most of the book is spent on point-by-point analyses of IBM's Information Man-

agement System (IMS), Cincom's Total, Software AG's Adabas and MRI's System 2000. These are described separately, then comparatively.

The book ends with extensive cross-reference glossaries so users can "translate" vendor's terminology.

The Q.E.D. book including updates will be available for \$385 from 170 Worcester Road, Wellesley Hills, Mass. 02181.

The *Casebook* is being distributed by ADL Systems, Acorn Park, Cambridge, Mass. 02139.

Partition Balancing Improved, 3330 Support Added to 'Sprint'

MANTECA, Calif. — DOS/360 users can now spool data to and from IBM 3330 or compatible disk systems, with an enhanced version of the Sprint Spooling System just released by Jason Data Services Inc.

The update also adds the 3330 to the system resources being monitored by the job accounting portion of Sprint. In its initial implementation, all files to be spooled and/or monitored must be within the first 250 cylinders of the 3330 disk, Jason said.

The extension means that Sprint can now handle 2311, 2314 or 3330 type devices but, the company admitted, users are still unable to mix device types under Sprint. All files being handled concurrently must be on a single type of disk.

Sprint has also been extended to include a "device address independence" feature by which, Jason said, JCL entries are automatically changed based on the partition being used for a job. Related en-

hancements, including automatic volume recognition and scanning of the PUBs for available tape drives are scheduled for release later this year, a spokesman added.

Relocating Loader Expected

A relocating loader is currently undergoing field tests, he said, and is expected to be generally available during the next three months. With this feature in place, users will save storage space now devoted to duplicating copies of programs that are currently used in more than one partition, and should gain operating efficiency since jobs can be loaded into any available partition.

The basic Sprint package, including card reader-, card punch-, printer- and tape print-spooling, and job accounting, rents for \$95/mo. A perpetual lease, for \$2,200 plus \$150/yr for maintenance is also available.

Special features, including multiple partition spooling, the device address independence feature and the upcoming relocating loader cost an extra \$85/mo, or an extra \$800 on the perpetual lease plan.

Jason Data Services is at 903 East North St., 95336.

Data Decks Massaged for \$25

ATHENS, Ga. — Analysts who need to determine the effects of variations in tabular input data can make the changes easily and see the results with a Fortran program developed by North American Rockwell which is now available for \$25 from the Cosmic clearinghouse at the University of Georgia.

The program (Cosmic number MFS-24360) can modify an existing data deck with a minimum of additional input data. In addition, two decks can be altered independently of each other, and merged to form a new single deck.

Changes which can be handled by this utility program include the biasing, in a positive or negative direction, of independent variables in one or two decks. Otherwise, the dependent variables of these decks can be added or subtracted to form a new set, Cosmic noted.

Going further with this program, the user is able to multiply the dependent variables by a constant factor, or a positive or negative term can be combined, with the results carried over to two new sets or to a combined set.

Program output includes printout and punched cards. The printout lists the input controls and factors, along with the case title, the old data card values and the new deck values which are punched.

The capabilities of this program lend themselves to the problems of creating test data in addition to supporting analysis of the original input data, a Cosmic source suggested.

Documentation for the 60-card program is available for \$2.50. The program and documentation should be ordered from Cosmic, 112 Barrow Hall, 30601.

NCR Handles Queries Into CIF, From 260s

DAYTON, Ohio — Commercial banks using NCR's Central Information File (CIF) software system for maintaining account records can now use NCR 260 data terminals for on-line inquiries, with responses in one to six seconds, according to an NCR spokesman.

A new Commercial Bank Inquiry (CBI) program permits the 260 to access the CIF with responses directed to the terminal's heat-activated printer, which is said to produce copy three times as fast as conventional teletypewriters. The inquiries can be made either against account number or other numeric key.

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JCL changes. You simply use a computer to schedule your computer and run the jobs smarter.

System III has been in operation on 360 and 370 systems for three years in many major United States corporations on DOS, MFT and MVT systems. One client recently with a 370/155 MVT system got over a 50% increase in throughput in less than six months.

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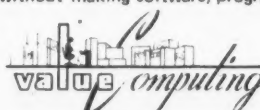
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Data Briefs

Dartmouth Plans Upgrade To Dual Honeywell 716s

HANOVER, N.H. — The Kiewit Computation Center at Dartmouth College is planning to upgrade the Dartmouth Time Sharing System (DTSS) by installing new communications front-end processors.

Kiewit plans to install dual Honeywell 716s to replace the Datanet 30s now in operation. The 716s will process data 20 times faster than the existing front ends and will allow the DTSS to handle 192 access ports instead of the present 173.

The 716s will operate with terminals transmitting data at speeds from 110- to 300 bit/sec. The DTSS is presently used by 60 colleges and high schools in the U.S. and Canada.

NCR Adds Modems

DAYTON, Ohio — NCR has introduced two modems for its data terminals and the Century CPU series.

An integrated model, the 698-300 is installed within the 621-103 multiplexer while the 752-200 is a free-standing unit.

Both asynchronous modems operate at 1,200 bit/sec on dial-up or private lines.

The 752-200 costs \$1,000 or \$35/mo while the 698-300 sells for the same price but rents for \$30/mo.

HP Unit Checks Errors

PALO ALTO, Calif. — Hewlett-Packard has announced a bit error rate measuring system, consisting of a 3760A Data Generator and 3761A Error Detector, for high-rate digital systems.

Using Pseudo Random Binary Sequences (PRBS) with bit-by-bit comparison to measure Bit Error Rate and Total Error Count, the 3760A/3761A system is designed for test equipment and systems using pulse-code-modulation (PCM).

Price of the system is approximately \$8,100. Deliveries will begin in April from 1501 Page Mill Road, 94304.

Tester Selects Speeds

CHERRY HILL, N.J. — A lightweight, portable test message generator, designed for use with teletypewriter and data circuits, is available from Computest Corp.

The Model TG-542 operates at 12 data speeds from 45.5- to 4,800 bit/sec. Signals can be distorted in 5% increments up to 45% with switch-selectable marking, spacing or other variables.

Unit price is \$750. Delivery is from stock from 3 Computer Drive, 08002.

Cornell University, the University of Virginia and Bowling Green State University have ordered UT-1 programmable, remote job entry terminals from Unitech. The terminals will be used for both administrative and instructional purposes.

Unitech is at 1005 E. St. Elmo Drive, Austin, Texas 78745.

User Eliminates Modems

Local Terminals Tied Directly to CPU

By Ronald A. Frank
Of the CW Staff

DALLAS — The exact conditions under which hardwired equipment will operate successfully are difficult to define. But users who transmit data over short distances may be able to hardwire their terminals to the CPU and thus save the cost of modems.

Alford Refrigerated Warehouses has nine Memorex 1240 communications terminals connected to its 360/40 in the same building. The terminals are up to "four floors and across the length of the building," according to David White, DP manager, and they operate without modems. Some of the hardwired terminals are "a half mile away," White said.

"We were not sure the terminals would work at that distance but we tried it and they did," White said. There were some wiring changes that had to be made to the equipment since the EIA interface pins are arranged for connection to a modem.

Semper Paratus

One major change was to strap the send pin on the CPU to the receive pin on the terminal and vice versa. Another signal Data Set Ready was strapped so the terminal is ready all the time. These changes are relatively easy to implement and often allow the user to install a more sophisticated terminal because of the money he is saving by avoiding the cost of modems.

The Alford terminals are not part of a seldom-used installation, according to Judd Human, programmer/analyst. The

company is a public warehouse and processes about 1,000 orders per day through the Memorex terminals into the Model 40. The warehouse complex includes two half-mile-long buildings which store approximately 100 million pounds of food commodities.

When a food broker phones in an order, it is entered on a 1240 terminal and transmitted to the Memorex 1270 control unit which replaced an earlier IBM 2702. The order is processed by the 360/40 and a bill of lading and invoice are sent to a terminal in the proper section of the warehouse complex.

"Often a shipment can be on its way to the food broker's customer within minutes," White stated. The 2702 is about \$500/mo less than the IBM line controller, he estimated.

In addition to its independent terminal equipment, Alford uses Calcomp double-density disks on its 128K Model 40 and the GMP multitasking software package from Computer Information Management that runs under DOS.

Not all of the firm's lines operate without modems. The warehouse also maintains a 400-mile link to Corpus Christi which includes Data Products modems and teletypewriters.

The hardwired terminal equipment, which includes Memorex 1250s operating in unattended mode to produce hardcopy control information, has saved the firm about \$1,000/mo in modem rental charges and potential phone lines costs, White estimated.

The 1240s are used about nine hours

per day by order clerks and also provide interactive information from the CPU to the operator. The 1240s can operate at five switch-selectable speeds, from 10- to 120 char./sec, which can be received by the auto-speed capabilities on the 1270 line controller. The IBM 270X series does not include the ability to handle various speed lines in the same manner.

Telephone Firms Seen Filing State Tariffs

PHOENIX — The telephone companies will respond to competition from customer-provided equipment by filing "responsive pricing" tariffs on the state, rather than the national, level.

Phone company competitive offerings should be allowed "at any price that does not cast a burden" on other subscribers, according to William K. Jones, a member of the New York Public Service Commission.

Speaking about interconnection problems at a seminar sponsored by the International Communications Association, Jones said caution with limited experimentation is desirable. Specific types of equipment should be interconnected with the phone network on a piecemeal basis to gain experience about any harmful impacts on the phone network.

Terminal Reduction

The growth of customer-owned terminal equipment will be matched by a reduction in the growth of new telephone company terminals rather than a sharp drop in phone company equipment, Jones predicted. Noting it has been over four years since the Carterfone Decision, Jones said there has been no indication that the phone companies are burdened with quantities of obsolete equipment.

The "competitive process" between phone companies and independent vendors "does bring progress," he said. "Innovations first developed for the sophisticated business user" will be adapted to the needs of all users, he predicted.

The regulation of telephone companies often does not work effectively because the volume of work "simply exceeds the capacity of most regulatory agencies."

If a certification or inspection plan for interconnection equipment is developed, the phone companies should be responsible rather than independent testing agencies, he said. The benefit of central responsibility for phone network quality will outweigh any discrimination by the telephone company against non-carrier equipment, Jones said.

Biplexer Provides 19.2 kBit/Sec Speed Without Wideband Line

NEWTON, Mass. — Codex Corp. has a communications device to allow data users to transmit at 19.2 kbit/sec over two voice-grade channels at up to 50% savings.

Under existing technology users who want to transmit at 19.2 kbit/sec must use Bell wideband facilities and high-speed modems. But the Codex device, the 296 Biplexer, allows the user to combine two conditioned voice-grade channels with 9,600 bit/sec modems and two Biplexers to achieve the 19.2 kbit/sec capability.

The Biplexer transmit section splits incoming traffic into two 9,600 bit/sec serial streams each of which is transmitted, using Codex 9,600 bit/sec or equivalent modems, through dedicated voice circuits, the company said.

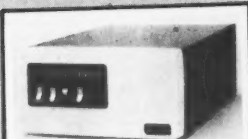
The 296 can also be used at speeds below 9,600 bit/sec. It can be used with two 7,200 bit/sec data sets over two private lines for a 14.4 kbit/sec transmission capability. Or a 9,600 bit/sec line

can be configured with four dial-up lines and 4,800 bit/sec modems.

The receive section adjusts continuously and adaptively for differential delays of up to 100 msec in the two channels and recombines them into one 19.2 kbit/sec output.

A 100-mile wideband data circuit using AT&T Series 8803 lines with Bell 303 modems would cost about \$2,303/mo, a Codex spokesman estimated. A similar capability using two Bell Series 3002 voice-grade lines with C2 conditioning, four 9,600 bit/sec modems and two Biplexers would cost \$1,948/mo.

On a 500-mile network, the Bell cost would be \$7,175 compared with \$3,020 for the Biplexer configuration. The Biplexer costs \$5,000 or \$150/mo and includes automatic fallback to lower data speeds and to single channel operation. In addition, the device has remote and local loopback features for diagnostics. Codex is at 15 Riverdale Ave., 02195.



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Analysis—Part IV

Will Data Users Want to Share Their CPU Resources?

By Ronald A. Frank
Of the CW Staff
(end of series)

WASHINGTON, D.C. — The application filed by Packet Communications Inc. with the Federal Communications Commission proposes to bring the advantages of a packet-switched resource-sharing network to computer/communications users. Industry observers who have studied the proposal find little argument with the viability of such a communications system. By arranging data into fixed lengths (packets) it is generally agreed communications facilities can be utilized much more efficiently than present methods.

But the resource-sharing concept raises more serious questions. The operating model for PCI is the Arpa network which is operated by the Defense Department for academic and research institutions. And organizations connected to the net are required to share the capabilities of

their CPU with others who may want to access it.

Whether this communal DP approach can be translated to the competitive, proprietary environment of the business user is still to be determined. There are those who argue that a business user on a resource-sharing network would refuse to make work space on his CPU available to others who might even include his competition.

Many business users have highly refined in-house software programs they consider to be part of their business assets. This type of user might not want any outsider accessing his CPU, much less his data base.

There are, of course, elaborate safeguards that could be built in by users to restrict those sharing the resources of their CPUs. The time-sharing companies have done an impressive job of keeping data thefts to a minimum despite the fact

that many customers access their DP centers. And undoubtedly resource-sharing customers could do the same, if they want.

But if the packet-switching methodology is the most important aspect of the PCI proposal, other carriers may be able to provide similar capabilities under existing services.

Datran has already told the FCC it plans to incorporate computerized switching centers into its data-oriented network. And it would not be too difficult for other specialized carriers such as Microwave Communications Inc. to incorporate a packet-switching service, if there were no regulatory prohibitions.

For that matter, the existing carriers might even consider offering such a capability if it really makes more efficient use of an already-scarce frequency spectrum.

It is hoped that the PCI application will not become the test case of the regula-

tory arena. The seven-year regulatory fight waged by MCI should not be duplicated by those who oppose the PCI plan.

There are important differences in the PCI approach that favor early approval. The company plans to utilize existing communications facilities; it will not be erecting towers or laying cables; it proposes instead to use existing facilities in a different way with DP equipment it plans to develop.

The PCI network will bring additional competitive factors into communications but it should be left to the customer to decide which services he needs.

AT&T Says DDS Net To Help All Its Users

WASHINGTON, D.C. — AT&T has told the FCC that those who oppose its application for its Digital Data System (DDS) "are motivated by private rather than public interest considerations."

The DDS system will provide "economic benefits to all users of Bell System services" and should not be delayed, AT&T said.

The FCC is currently considering a Bell proposal for the first link in its DDS network, scheduled to begin operations in 1974.

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Bits & Pieces

Calcomp Adds X-Y Digitizer To Flatbed Plotting System

ANAHEIM, Calif. — Calcomp has introduced a digitizer for the firm's flatbed plotting system.

The Model 942 free-cursor digitizer is a self-contained unit with electronics housed in a cabinet beneath the table, the firm's spokesman said.

The work surface is a standard size drafting table incorporating a digital display unit to show users X-axis position, Y-axis position and digitizing sequence.

With the digitizer, users can obtain software for a host computer, enabling operations such as: coordination rotation, independent X and Y scaling, variable grid-ding, absolute/incremental operation and conversion to user coordinates, the spokesman added.

Interfaces are also available for ASR 33, ASR 35 and Olivetti teletypewriters as well as for the IBM 029 keypunch.

Price with keypunch interface is \$20,764 from 2411 W. LaPalma Ave., 92801.

Data Disc Enhances Terminal

SUNNYVALE, Calif. — Data Disc, Inc. will begin using the Matrix 1100DD combination printer/plotter — from Versatec — with its 6611/6612 terminal.

The 6611/6612 terminal presents graphs and charts of over one-fourth million individually addressable points and can display over 3,000 alphanumeric characters on the screen, a spokesman said.

The electrostatic hard-copy output plotter/printer reproduces any information shown on the terminal's video display screen — any combination of words, figures and graphs — on 11-inch paper, he stated.

A typical system of eight terminals, supporting devices plus one printer/plotter would cost around \$56,000 from 686 W. Maude Ave., 94086.

Security System for Remote Areas

CHATSWORTH, Calif. — Users who wish to control security in areas with one or two access points, where traffic flow does not warrant security guards, can obtain a two-station security access control system from Cardkey Systems.

The 202 System is a card insert device that, besides admitting valid cardholders, will automatically void any invalid or stolen card.

An optional printer is offered to record entry and exit data concurrently with the actuation of the access controller.

The system has a capacity of one to 99 individual card numbers and starts at \$1,936 from 20339 Nordoff St., 91311.

Through the 'Looking Glass'

DEC Offers PDP-11 Users Multiprocessing

By Michael Weinstein
Of the CW Staff

MAYNARD, Mass. — Digital Equipment Corp. has introduced a hardware "window" to provide PDP-11 users with many of the advantages available with IBM multiprocessor systems.

The window concept allows memories and control of peripherals to be dynamically shared among two or more processors in a multiprocessing configuration.

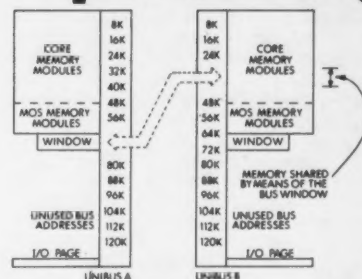
Each PDP-11 requests the portion of the other processor's memory it wishes to

access, on either a read/write or read-only basis.

Connections are established between each processor's Unibus so that subsequent memory references are handled on a transparent basis.

Since all peripheral control registers also have addresses associated with them in the PDP-11 series, selecting the last 4K words of the other processor's address space permits peripheral sharing as well.

The DA11-F Unibus Window is a high-speed interbus channel needed to connect two PDP-11s into the "duplexed" con-



This simplified example uses identical processors and only one window port. A is the originating bus with an 8K window located at 64K. It has been initialized to connect to location 32 — 40K on Unibus B.

figuration. It is a bus-to-bus connection permitting interbus direct memory addressing transfers and single word accessing.

The DA11-F allows one processor to access addresses on a companion system's Unibus by translating requests through the unit's bus-address space into requests on the companion's Unibus.

Transparency is accomplished by having the synchronization done internally by the DA11-F's hardware.

Any unused block of addresses on the Unibus — from 32K to 512K words in size, can be designated as the window. Normally, it is placed on the Unibus locations directly above the last memory module. Thus, on a system with 64K words of memory, an 8K window would be placed from 64K to 72K on the Unibus.

Once the window is initialized, any access to a location between 64K and 72K will be translated automatically into an access to an 8K word access area on the companion PDP-11's Unibus.

The 8K area to be accessed on the companion system's Unibus is selected as part of the initialization process.

Thus, the window operation involves both the Unibus on which the access was requested — called the originator bus — and the Unibus through which the actual access was performed — called the target bus.

Any type of address access — instruction fetch, data fetch, data write or DMA-type block transfer — can be performed through the window.

Each processor in the multiprogramming configuration is not limited to a single window; thus multiple windows can be initialized to allow intercommunication between several processors.

Any processor in such a network can execute code contained in another computer's memory. Or a mass storage device can transfer data to any designated or requesting processor.

The DA11-F Unibus Window costs \$5,950.

NCR Users Pleased With Hardware But Want More Software Support

By a CW Staff Writer

NCR users are happy with the cost of their systems, the performance of their central processors and the firm's efforts to support them.

They have some residual reservations about peripheral equipment — but feel the situation has greatly improved — and claim the most immediate need is in the area of software support.

A *Computerworld* survey also confirmed that NCR is largely the computer company of the first-time, small budget user, with many users coming from the ranks of the firm's cash register customer base.

Many NCR users are operating on low budgets without previous computer experience — or as one president of a local user group stated, "initially the software is smarter than the user."

Even with these added problems, many NCR users queried were high in their praise of the service they received.

Good Support

Robert Naylor, DP manager of Polymer Corp., related how NCR had set up a special team to help him and spent three weeks at his installation without charge to his firm.

Robert Neese, DP director of a New England bank, attributed the quality of NCR's service to the already existent branch offices set up to service the firm's other equipment.

By combining the offices, he felt, NCR was able to offer local service in many remote areas that would not support a computer service office alone.

Roby Robinson of Weben Industries was not so sure, since, he said, many servicemen were previous cash register repairmen who had been retrained.

"While they mean well, and try to solve all of our problems, they are really 'men for all seasons,'" he stated.

Neese noted that while he was an IBM user, he had access to a specialist for every application.

But he said IBM charged dearly for this service, both in consulting fees and in the increased cost of the system.

King for a Day

When users were put in the hypothetical position of being chairmen of the board for NCR and asked what areas should be improved, most responded they would like to see better software support and a few said they would like to see better peripheral equipment.

"It takes too long for software packages to be released and once released the local people are too much the generalists to help with specific programming problems," complained Clyde Weaver, president of the Mid-West NCR Users Group.

This was the only failing he could find in his relationship with the supplier.

But his comments were echoed by enough users to indicate this as an area where NCR should concentrate.

Other problems cited by users in the software area include the desire for a better operating system and easier access to key personnel.

One user related he did all his system work himself. "It would be foolish to ask my local branch for help as they know less than I do about programming. I realize in time the reps will learn and they are trying, but for the present I must solve my own problems."

In the area of hardware, all users had only praise for the central processors, but when the subject turned to peripheral equipment they had some disclaimers.

Of the peripherals, the one most under attack was the 655 disk subsystem which previously had experienced many head crashes, the users said.

But instead of detracting from their praise for NCR most users were impressed with the efforts the firm took to alleviate the problem.

Roby Robinson indulged in a little crystal ball gazing and felt the agreement with CDC would help the user in the area of peripherals.



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IBM Bubbles May Be in User's Future

YORKTOWN HEIGHTS, N.Y. — Within five years storage units may be able to hold more than a billion bits of data per square inch using magnetic bubbles on the surface of amorphous film with a process shown by IBM's Research Division.

Amorphous material is composed of molecules that are not set in a rigid order, thus they have not been previously investigated as a possibility for bubble applications, R.E. Gomery, IBM director of research, noted.

The bubbles are cylindrical islands that form on the surface of the material and can be observed under a microscope.

To create a computer storage

device based on bubble technology the bubbles must be aligned in paths so the presence of a bubble would indicate a

Looking Ahead

"one" and the absence a "zero."

Although scientists were reported unwilling to speculate on when this technology might reach the computer user, the researchers have already fabricated an experimental shift register to operate with bubbles two one thousands of a millimeter thick.

The potential breakthrough is not in the use of bubbles as a storage media but rather that

amorphous material can be used.

Because of the difficulty of preparing crystalline material — used previously in research — many observers thought the bubble concept was dead as far as commercial memory makers were concerned.

"This new application gives bubble technology a new lease on life," Gomery claimed.

Similar research is being conducted by Cambridge Memories, Concord, Mass., with their Domain Tip (DOT) efforts.

The difference in the two approaches is that IBM is concentrating on amorphous film with Cambridge Memories working through polycrystalline film.



Praveen Chaudhari, IBM Research Division, points out the irregular arrangement of atoms in a model of the film. Vertical alignment of atoms is shown by arrows pointing upwards.

Process Control Users Offered Program Control

SUNNYVALE, Calif. — Users with production and process control applications are offered a series of general-purpose, solid-state program controllers from Hugel Industries Inc.

The Real Time Programmer (RTP) series controls from 10 to 30 operations in any sequence and provides the user with up to 16.5 hours of unattended processing control, the firm's spokesman said.

Timing accuracy is provided by a precision electronic clock, allowing the user to select intervals down to 1/4 second.

Real time operation intervals can be directly programmed in hours, minutes and seconds, the spokesman said.

The RTP 10 x 10 has ten interval and ten output channels.

The RTP 10 x 10, costing \$2,500, has 10 interval channels and 10 output channels, while 10 x 30 and 20 x 30 units are \$3,500 and \$4,900 respectively from 625 N. Pastoria Ave., 94086.

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DOSRELO

DOSRELO provides a method of making DOS problem programs self-relocating. DOSRELO accomplishes the self-relocation capability for all programs, regardless of the language, by adding entry point logic to the object code of the program before the Linkage Editor catalogs it on the Core Image Library.

CIMS

The Computer Installation Management System (CIMS) provides a method to supply management with pertinent information in the utilization of their data processing hardware. CIMS accepts data collected by the System Management Facility (SMF), formats the data and presents the data in varying sequences and formats. Reports for job accounting, multi-programming throughput, hardware analysis, and others are provided.

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Only when our customers succeed do we succeed.

New OEM Products

Mini Standard Features Previously Only Options

IRVINE, Calif. — Microdata Corp.'s Model 400/10 minicomputer for the OEM marketplace incorporates several standard features normally offered as extra-cost options, the firm stated.

The features include power fail/auto restart, real-time clock, DMA channel hardware priority interrupt and hardware index register.

The 8-bit core memory has a 1.6-μsec cycle time and is expandable from 1K bytes to 65K bytes, accessible with direct or indirect addressing.

An optional I/O system can be specified to include four buffer input interfaces and four buffer output interfaces. Each interface provides three control lines and two interrupt lines.

Software for the mini is compatible with the previously announced Micro 400 minicomputer.

Price in 100 unit quantities is \$2,250, including CPU, 4K bytes of memory, desk-mount enclosure, power supply, system control panel and supporting software.

Power Supplies for Peripherals

MINNEAPOLIS — Control Data, through its Magnetic Components Division, is offering a line of "building block" power supplies, designed expressly for builders of peripheral equipment.

All models in the Stak-Pak Series have adjustable outputs with a range of +15% to -10%, adjustable current limit foldback protection and adjustable crowbar over-voltage protection. Output regulation bandwidth is ±0.5% with peak-to-peak ripple at ±0.5% maximum. Input voltages are 115 Vac ±10% reconnectable for 230.

The Model LC Series are 5, 12 and 24 V, range from 1.5 to 5 A and measure 3.68 in. by 4.83 in. by 6.53 in.

Single quantity pricing ranges from \$65 to \$275, with delivery from regional stocking centers for "same day shipment."

Keyboards Are MOS-Encoded

JUSTIN, Calif. — A series of MOS-encoded TTY-33 Keyboards, featuring redundant contact BI-PAC switch modules, a 40-pin ceramic MOS chip for encoding four mode Ascii code and N-key rollover are available from Controls Research Corp., Santa Ana, Calif., for interactive computer printing, display terminals and related ASR-33-compatible applications.

Price is \$125 in quantities from one to 25 and drops to \$59 in quantities of 5,000.

Disks Offered Mini Designers

HICKSVILLE, N.Y. — Per Data has introduced a series of moving-head disk drives with storage capacities from 25M to 100M bits per drive.

Up to four drives can be daisy-chained for a total storage capability of 400M bits.

Access time is 10 μsec track-to-track, 35 μsec random; data rate at 2,400 rpm is 2.5 MHz.

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Banking System Can Replace Tellers

DETROIT — Financial institutions can install automatic teller systems from Burroughs to allow customers to perform transactions at any time of day, according to the firm.

Installed in lobbies or outside walls of banks, credit unions or in locations such as shopping centers, the RT 3000 and RT 4000 teller systems can be used to withdraw cash from a savings or checking account, charge a withdrawal to a credit card account, make deposits, transfer funds, pay bills by debiting an account or pay bills with cash, a firm spokesman said.

To operate the self-service system, a customer inserts a special magnetic card into a reading device to index a lookup table and verify if the user is a valid cardholder.

Instructions are then displayed on panels above the unit's keyboard to guide the user through the specified transaction, the spokesman added.

The card is returned after the transaction is completed. As a security feature, the RT systems can be programmed to retain any card reported lost or stolen.

The RT 4000 can be connected by telephone line to a central computer so accounts can be updated in a real-time application or information can be written on files for future programming. The RT 4000 can also perform as a stand-alone unit, the spokesman added.

The RT 3000 can only operate as a stand-alone unit with the unit recording transaction information for future processing.

The RT 3000 and RT 4000 systems are extensions of previously announced RT 2000 on-line and RT 1200 off-line cash dispenser units. The magnetic customer card can be used with other Burroughs terminal systems, such as the TU 500 commercial teller terminal and the TU 300 credit authorization terminal.

Eight Models

Presently there are eight models within the RT 3000/4000 series with purchase prices ranging from \$27,829 to \$36,630 and monthly lease prices from \$696 to \$816.

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3421	TRANSISTOR, 2N3054	30	1.25	37.50
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Panelists Agree

Some DP Experience Needed Before Going In-House

By E. Drake Lundell Jr.
Of the CW Staff

BOSTON — Whether a business is small or large, a business needs to get used to the discipline of computerization and have its paperwork procedures well under control before installing an in-house system, a recent panel here on small systems agreed.

Both of the representatives of small businesses on the panel — Morris Carver, president of Atlas Paper, and Alvin Alosi, controller of Food Enterprises Inc. — indicated they had either used time-sharing or service bureaus before installing a system in-house in order to get their initial experience in computer use.

Carver said Atlas needed the help of computers just to meet its billing problems, particularly after it had instituted a policy of adding an interest charge to overdue accounts. The manual system

just couldn't keep up, he said.

The firm first went to time-sharing, but as its needs for DP increased, so did its monthly bills so it switched to the Basic 4 computer for in-house use.

Carver said the firm wanted a system that could be operated by non-computer

Alvin Alosi said Food Enterprises first used a service bureau, but decided to go to an in-house system (a Singer 10) because the turnaround time from the service bureau was not fast enough due to delays in getting complete material to it.

One Toe In

The experience with the service bureau helped the firm get its "feet wet" in DP, but Alosi felt that even the small user should have at least someone in the organization that was capable of full-fledged programming, unlike Carver who thought only part-time programming would be needed.

The most important part of the planning for an in-house system, Alosi indicated, is in the configuration planning stage.

"This is where many systems go wrong," he claimed. Even with excellent

assistance from the system vendor, the help is only "as good as the user's management input to the vendor's systems engineers."

Besides giving the vendor organization detailed input, the user also has to investigate and evaluate his needs carefully before launching an in-house project, he said, so that the equipment will fit his needs exactly — both at the present and in the future.

Alosi "strongly recommended" in-house programming efforts because it made the user more independent of the vendor and because it allowed the user to develop or tailor particular programs to fit the needs of his business more exactly.

At GTE Sylvania the need to go to small systems was for radically different reasons than in many small businesses, according to John Krenn, a DP consultant in the organization.

No Programmers Here

The company wanted to install compatible systems in each of its 23 warehouses around the country and it wanted

"Basically, we wanted a system that any gorilla could operate."

to get systems that needed no local programmer assistance.

Therefore its decision on which system to acquire was based to a large part on selecting a manufacturer that was capable of maintaining systems in remote locations — both the hardware and software — and systems which could accept remote programming changes.

The firm wanted to maintain a "low DP profile" at these warehouse sites and the Tempo II systems they acquired could be placed virtually anywhere without special environmental configurations and would not need trained operators.

"Basically, we wanted a system that any gorilla could operate," Krenn indicated.

"What separates the men from the boys offering small business systems is demonstrable software," Krenn indicated, "and one that is prepared to support the basic applications of the small user."

For example, he said, the small systems supplier should offer conversion programs so a small user will not have to convert all of his internal codes to the industry-accepted — and computer-accepted — codes by hand.

"If the firm does not have the software, don't bother with it," he told the prospective users in the audience.

He also told them: "Don't mechanize a mess. You have to have your paperwork under good discipline before turning to computers or you could just make the situation worse."

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Library of Programs, Solutions

Nasu Head Attributes Growth to Members' Helpfulness

By E. Drake Lundell Jr.

Of the CW Staff

LOS ANGELES — With 2,500 members, the National Association of IBM System/3 Users (Nasu) is now looking forward to a membership of over 3,500 by the end of the year, according to Irwin Cohan, president.

The reason for the growth is not only the growth in S/3 installations, he indicated, but also the increase in software available from the organization at little or no charge.

Nasu's Library

Presently Nasu maintains a library of over 100 systems programs written for the S/3, he noted, all of which are available at no charge to members of the organization.

There are also 30 programs in the applications library that are available for a \$25 handling fee, which includes all documentation.

Some of the S/3 users, Cohan indicated, get all of the packages they need to get started from the organization's libraries.

All programs are given to the organization by members who seem willing to help newer users get started in the business. The most experienced members

seem more than willing to donate programs to the library, Cohan noted, even though they probably are the ones who use the programs in the library the least.

Six for One

In order to foster this type of sharing between users, Cohan said, Nasu has implemented a system under which a user can get six applications programs free in return for submitting one to the library.

The programs are particularly valuable, he indicated, since only about half of them are available in any commercial form either from IBM or from independent software houses. Therefore, Nasu's library is often the only alternative for a user who doesn't want to or can't afford an in-house development program.

He also noted that S/3 users do not always have the resources to purchase programs, even if they are available for a fee.

All program improvements are also passed on to Nasu members as they are made, even if they are made by someone other than the original program developer. In this way, the small user can avoid the cost of maintaining a large staff

Societies/ User Groups

just to keep programs up to date, he indicated.

The organization also invites non-IBM suppliers to speak at chapter and regional meetings, he said. The S/3 user is very budget conscious and, although he is locked into IBM to a certain degree, he can be very independent when there are less expensive products available.

In fact, Cohan said, the S/3 users probably use more independent peripherals than their brothers in larger 360 shops,

with the predominance of the independent equipment being in the off-line category such as card readers and punches.

The organization also maintains a file of problems that S/3 users have experienced and how they were solved. This information is available to all users either through written inquiries or through a "hot line" telephone service maintained by the group.

In order to keep the dues for the organization at the rate of \$30 yearly, Nasu will soon be moving its headquarters to the Las Vegas area.

Cohan indicated that the cost of doing business in California is becoming prohibitive. "We have wanted to keep the price as low as possible so that we can attract and serve a large number of users," he said. "With the low budgets for most System/3 installations, the cost of an organization like ours has to be rock bottom."

NCR Users to Meet

DAYTON, Ohio — The NCR Retail Users Group is gathering here for its spring meeting March 7-9 which focuses on point-of-sale terminals.

The agenda provides a chance for users to discuss subjects of common interest and exchange ideas.

For information contact Irwin B. Newman, Frederick Atkins, Inc., 11 W. 42nd St., New York, N.Y. 10036.

ACM to Rent, Sell Film, 'Computer History Digest'

NEW YORK — The Association for Computing Machinery (ACM) has released the film "Computer History Digest," which was prepared for viewing at the ACM Conference last August.

The eight minute black-and-white film is comprised of shots from major manufacturers, with a narration tying the history of the industry together.

The film is available for \$95 or on a rental basis of \$15 for two weeks use plus handling costs from ACM, 1133 Avenue of the Americas, 10036. ACM chapters can obtain the film for only handling and mailing charges.

ISA Brochure Lists Papers

PITTSBURGH — A free brochure entitled "1972 Annual Conference Publications" from the Instrument Society of America (ISA) lists over 100 instrumentation papers focusing on the state of the art and applications.

Papers from the 27th Annual ISA Conference are published in the form of preprints booklets and bound proceedings.

Ten papers on data handling and computation are listed, along with others on scientific instrumentation, automatic control systems and other topics.

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Topics Abound at Systems Management Conference

NEW YORK — The American Management Association's (AMA) 19th Annual Systems Management Conference will focus on specialized concurrent sessions geared to specific job problems and goals.

The three-day conference March 12-14 at the Americana Hotel here will be followed by a two-day briefing session on "Systems Performance: Measurement, Evaluation and Utilization."

On Monday, following a keynote address on "Management, the Computer and People" by AMA President James L. Hayes, two of the all-day sessions on project management and data transmission will convene.

Project management will examine the preparation phase, computer support and the execution phase of project management.

"Data Transmission: What is Happening — What Can Be Expected?" will include an overview: preset transmission services, high performance, data sets and cost, as well as a management-oriented perspective on present commercial prac-

tice in data transmission capabilities and costs. The last part of the session looks at the realities of MCI, Datran and Bell's digital data service as they pertain to specific 1973-74 system planning.

Other Monday sessions include cash management, management control of the corporate computer activity, understand-

Societies/ User Groups

ing virtual storage and evaluating and purchasing software packages.

"Management Control of the Corporate Computer Activity" will examine such aspects as maximizing cost effectiveness. The session also will focus on the DP center as a stand-alone, self-supporting service bureau of the corporation as well as management and personnel education and development.

The session on evaluating software packages will be chaired by Lawrence Welke, president of International Computer Pro-

grams, Inc.

Tuesday, following the lead of Kenneth Olsen, president of Digital Equipment Corp., in his keynote on "Minicomputers in a Distributive Information Systems Environment," an all-day session on distributive computing systems will examine front ends and applications.

Chaired by William J. Horne and featuring Janet Norman, the Singer Co., Cmdr. Grace Hopper and Robert J. Curran of Polaroid Corp., the session also will focus on privacy and security in the data communications environment, knowing when to apply minicomputer technology, and the future growth of the market, equipment and user benefits.

"Data Base Design," another all-day session, is designed to help the user decide how to build and access a data base, as well as who should be involved.

Still other sessions on Tuesday are systems manpower planning, innovative techniques for specifying systems, EDP security management and charge-back systems.

Of concern to many data managers is the aspect of security. Robert Courtney, manager of data security and privacy at IBM, will chair the session which highlights physical security in operating procedures, and systems integrity to prevent loss of data. Other areas covered include structure for examining security measures and operating procedures to prevent accidents and duplication of efforts.

Wednesday's keynote address by John Diebold, president of the Diebold Group, on "The Cost Effectiveness of MIS" is followed by a morning panel session on "The Impact of Systems on Organizational Structures," chaired by Samuel B. Harvey, Singer Co.

Fee for the conference is \$150 for AMA members, \$175 for non-members. Price of the briefing session is \$250 for members, \$280 for nonmembers.

Attendance at both meetings costs \$350 for members and \$400 for nonmembers. Further information may be obtained from American Management Association, American Management Association Building, 135 W. 50th St., 10020.

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Ralston Explains 'Fine Line' View For ACM, Industry

NEW YORK — The basis for the recent controversy over the role of the Joint and National Computer conferences [CW, Oct. 11, 1972] is still a lively issue, as evidenced in the January ACM president's letter in *Communications*.

President Anthony Ralston envisions the Association for Computing Machinery (ACM) as walking the fine line of independence in the societies' relationship with the computer industry.

"ACM can only have the influence it should have on the policies of government and society related to computers if it is independent and seen to be independent of any specific element of the computing community," he declared.

"It must be clear to all that, as an organization, ACM has no axes to grind and is beholden to no one except its members," he continued.

Ralston suggested that only by preserving its independence from industry interests might it retain a position whereby it could conceivably file an *amicus curiae* brief in issues affecting the computer community, such as the question of software patentability.

The degree to which the society is perceived to be an independent entity would determine the effectiveness of such action, he noted.

A Bit Sullied

However, there is the matter of finances, and Ralston stated his article "does not mean posture toward the industry which requires the purity of Caesar's wife."

"ACM must continue to be involved in cooperative ventures with industry such as the Joint Computer Conferences so long as these are beneficial to ACM's primary scientific-technical-educational purpose," Ralston continued.

Such industry support as advertising in journals and sponsorship of newsletters, as long as it does not influence such things as editorial policy, provide important benefits to ACM's basic technical-educational mission, he conceded.

Ralston lamented that ACM has not been more successful in getting firms to participate in the corporate membership program, which he calls "a most appropriate form of support. It has no strings attached to it..."

Ralston concluded his letter by noting: "ACM's role with respect to the industry should then be not only one of friendliness and cooperation but, most important of all, one in which our independence must be paramount."

Choosing Front-End Processor? Better Check Non-Technical Area

By E. Drake Lundell Jr.
Of the CW Staff

BOSTON — Non-technical as well as technical features of various systems must be evaluated when choosing a communications front-end processor. And in many cases these non-technical considerations may outweigh the technical evaluations, according to Stan Dunten of Dartmouth College.

Such factors as maintenance availability, cooperation of the vendors and support available after the sale could be just as important as the technical aspects of the system, Dunten noted.

Planning Ahead

For example, he indicated a user might be smart to get a front-end processor from the same company that manufactures his host computer system because such an arrangement would ease the maintenance problems that might arise later.

In addition, Dunten said, with multi-vendor systems the user would have to have a great deal of in-house expertise in order to pinpoint problem areas and therefore call the right maintenance organization for service. This in-house expertise is not always available and can be expensive, he added.

On the technical side, Dunten told the ComputerCaravan/73 workshop on front-end processor selection that the interface between the front end and the data sets and communications world was the most important single consideration because that is the first thing the system user comes in contact with.

This connection to the data sets and the communications world must be smooth, reliable and error-free, he indicated, in order to serve the ultimate users of the system effectively.

The processor itself must be reliable, he said, and must have good character manipulation features since most of its time will be taken up with character manipulation functions.

On the other hand, the arithmetic capa-

bilities of the front-end processor are not that important, he said, and in some cases might even be dismissed with.

The front-end system, unlike the general-purpose host computer, does not need relocation and protect features, he added, since it will be used primarily for running a dedicated program.

The system has to be operated in a multiprogramming mode because of the large number of lines it will be handling simultaneously and it is "nice to get a system with a lot of registers because they are easier to work with than memory."

Regarding the interface between the host and the front end, Dunten stressed the need for a strong "master-slave relationship."

"You can't have both the front end and the host computer initiating jobs," he said, because of the resulting confusion. Instead, he said, the host should drive the entire system.

Programmer-Boss Interaction a Must

By Molly Upton
Of the CW Staff

BOSTON — Sitting down with programmers and "contracting" for a schedule can be helpful to both the supervisors and the personnel involved, according to Jim Schantz, manager of systems and software at Polaroid Corp.

The programmer participates in projecting how much time he will need on certain jobs over the next month, and the schedule helps guide him and give the supervisor some input for overall scheduling of projects in the department, Schantz explained.

The monthly plans drawn up with the individuals are extracted from an overall six-month plan for the department.

Some tend to be overly optimistic about the time jobs will take, and the supervisor should temper this optimism with some questions, in order to evolve a realistic schedule.

By job accounting for internal purposes, the supervisor can then find how much time a job consumed, and

can see where and why projects may be lagging behind schedule.

Although "technical types" are admittedly not inclined to bother with such paperwork, they can learn it is to their advantage, as well as the supervisor's, Schantz said.

The information obtained by the supervisor can be extremely helpful in justifying department expansion, or even the department's existence. Although not concurrent with salary reviews, performance reviews based on the input from the schedules can also aid the department in recognizing outstanding performers, who might not be as visible to top management as others.

The discussions between the programmer and supervisor also afford the programmer a chance to plan for individual advancement by discussing his interests and goals, and often an educational plan is mapped out, Schantz told a Caravan/73 programming management workshop.

"The key goal is to get a good interaction going," he noted.

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Le forum est une section de la Caravane Informatique où les utilisateurs peuvent échanger leurs expériences, poser des questions et obtenir des réponses. C'est une véritable communauté d'apprentissage où chacun peut apprendre de la pratique d'autrui.

Les sujets abordés dans le forum sont variés : programmation, gestion de bases de données, réseaux, etc. Les participants sont encouragés à partager leurs connaissances et à aider les autres à résoudre leurs problèmes.

COMMENT ?

La Caravane Informatique est une initiative qui vise à promouvoir l'usage des logiciels libres et à encourager le développement de logiciels innovants. Elle est organisée par un comité de professionnels de l'informatique, qui travaillent en collaboration avec les pouvoirs publics et les entreprises.

Les logiciels développés dans le cadre de la Caravane Informatique sont mis à disposition gratuitement pour tous les utilisateurs. Ils sont conçus pour être faciles à utiliser et pour répondre aux besoins réels des utilisateurs.

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Zip



★Putting Software to Work★

February 28, 1973

SPECIAL REPORT — Page 27

Despite the strong (and justified) interest in system software enhancement packages, the real key to how much work will be done on the computer lies in the number of application programs available to it.

And it just doesn't make sense to build a system from scratch if a comparable one has already been built, debugged and packaged for general use, and is available for less than it would cost to do it yourself.

This special report provides an overview of the types of software available from outside sources, and of the things users have found to be good or bad about the vendors.

Survey Snapshots

- **61% Bought Applications**
- **54% Have Had Custom Work**
- **93% Will Increase Spending**

More Users Going Out For Software Support

Once users start to get software support from independent sources, they don't stop their acquisition programs with just one package and they tend to find that packages generally operate correctly. According to a survey conducted in January by Frost & Sullivan, a New York research firm, the average user who has acquired any outside software has gotten at least two types of package.

Some users found that the packages they acquired didn't perform as expected, but most dissatisfaction was scattered. Criticism of documentation was the highest single complaint, but even that was mentioned by less than half of the users who responded to Frost & Sullivan's inquiries.

The survey was part of an analysis and forecast of the packaged software and "packaged computer services" industry to be published in March. The user part of the survey consisted of questionnaires mailed to the nation's 1,000 largest industrial firms, plus approximately 500 banks, hospitals and other non-industrial firms, but major computer users.

Three hundred and twenty-five DP directors replied in time to have their answers tabulated. Another 75 or so come in after analysis had begun. This was an "exceptionally high response," according to Frost & Sullivan's research director Hank Berler, and indicates the degree of interest the users have in the subject.

Applications Popular

Eighty percent of the tabulated replies reported that packaged software had been leased or purchased from independent sources during the past two years. Application packages were acquired by 61% of these users, and formed the largest category of acquisition.

Perhaps surprisingly, the class of support Frost & Sullivan called "complete self-contained applications-oriented systems," but better known as custom programmed projects, appealed to 54% of the users who replied.

Systems software — generally designed to enhance software provided by the user's mainframe maker — was purchased or leased by 51% of the users. By contrast, packages defined as "plug-to-plug

replacements for manufacturers' software were acquired by only 12% of the sample surveyed.

"Programming aids" were brought in-house by 51% of the users. Since the percentage for the various types of package acquired shows more than 100%, users clearly are acquiring more than one type, Berler explained.

Modification of packages has often been cited as one of the causes of the horror stories told about bringing in software from outside, but 63% of the users told Frost & Sullivan that they had changed or customized their purchases. The rest used them "as is."

Despite the modifications, 157 users said all packages performed functions for which they were acquired. Another 91 admitted that most packages did what

they were supposed to do.

In the Budget

Annual cost of the acquisitions ranged widely from user to user, stretching from \$135 to \$300,000, and averaged nearly \$33,000, the firm reported. Package expenditures represented as much as 25% of an individual user's total DP budget, but averaged only 2.75% across the entire sample.

An impressive 45% of all users said they expected to increase their annual use of software packages by more than 10%. Another 48% plan to jump their use of packages by up to 10%, while only 7% foresee a drop in their use of outside software.

When asked which aspect of software packages had disappointed them the

(Continued on Page 28)

Packages Form Standard Base for Firm

DETROIT — Packages are becoming more important to Bendix Corp. because they provide uniform approaches to applications and that fits well with the corporation's developing plans to consolidate its DP operations, according to director of information systems Jack Patterson.

Bendix is heavily committed to DP. Thirty-five divisions within the corporation are "active in DP," either having their own equipment or being linked to one of five centers around the country. Under the consolidation plan, the number of centers will drop but the services available won't, Patterson said.

Three major centers are at Ann Arbor, Mich., South Bend, Ind., and Teterboro, N.J. Each of these has a 370/155 except Teterboro, which has two of them in place. A lesser center, at Sidney, N.Y., has a 370/145, and another, at Baltimore, has a 360/50, but this is already being phased out.

"Many" other company locations have Remote Job Entry (RJE) terminals tied into these centers, Patterson noted. To support such a DP operation, he has 18 on his staff at the corporate level and a

total of about 450 people throughout the centers.

One of the first packages acquired was the payroll system from Management Sciences of America (MSA), which Patterson uses as the basic module of a system that had to be much larger and more complex to meet Bendix's needs.

Patterson's staff put in "some additional work," he said, admitting that the extra effort brought the real cost of the system up to 20 times the package price. But the corporation really anticipated this kind of expenditure, he added, so this is not a package horror story at all.

The system is operational, serving Bendix's worldwide divisions. The combination of the ongoing MSA support and the Bendix modifications takes into account not only the tax laws in all the jurisdictions in which Bendix employees work, but the sometimes sharply different union requirements in the various states and local districts, Patterson explained.

Repeating the thoughts of many package users, he added that Bendix acquired another application — to handle stockholder accounting — from an outside firm because there was no point in redoing something already available.

The particular system Bendix is using, from Stockholders Systems, Inc. of Atlanta, is a "good operation, with good support" from the vendor, in Patterson's view.

Under the corporation's DP consolidation plans, Patterson wants not only to cut back the number of data centers, but to provide applications that can be used by more than one division, and hopefully by as many as possible. With that goal in mind, he is about to acquire at least two other packages.

Westinghouse sells a purchasing control package that Bendix expects to use to

monitor that operation, which is common to many of its divisions.

Left unsaid, but certainly sensed, was the feeling on Patterson's part that since this system was developed by another manufacturing concern for its own internal use, it should serve Bendix better than one created by a software house which might be more interested in programming niceties than pragmatic, useful results.

Another impending acquisition is Atlantic Software's Project Control system (PC/70). While useful in structuring development projects within the DP department itself, PC/70 applies equally well for other projects and should provide management at all levels with a tool they haven't had before.

Users of application packages from outside sources often have one or more "data processing" packages as well, and Bendix is no exception. Informatics' Mark IV file management system and quasi-programming language have been used for some time. Patterson noted, as has Applied Data Research's Autoflow.

With all of its "in-house" facilities and applications, however, Bendix has also turned to another range of suppliers for capabilities it does not yet have through its own equipment. At present, Bendix is spending approximately \$10,000/mo to \$15,000/mo with time-sharing vendors, according to Patterson.

Citing GE and Applied Computer Time Share Inc. (Acts) as two vendors being utilized, he noted about 60% of the current T/S expenses are related to engineering research and development projects.

Thirty percent of the time-sharing load is what Patterson called "straight" financial analysis, presumably on actual historic data. The remaining 10% is used for "what if" games, simulating future financial situations, to choose the best of several alternative courses of action.

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Packages Are Puzzling

Choice Runs From 'As Is' to Near-Custom

Many users who have not used software from outside sources claim they just don't know what is available, what kind of support they can expect if they do buy a package or how much customization they would have to put into a project before it would be operational.

Not knowing what is available is in part a reflection of the scattered nature of the software industry but any user really interested in the possibilities could contact a local chapter of the various professional organizations or talk to other users.

More Direct Effort

Actually, however, users are looking for more direct effort on the part of vendors. Many of the DP managers answering a recent Frost & Sullivan survey on the package software industry said "more regular visits by software salesmen" would make them more aware of what is available, and presumably more interested in acquiring part of the action.

There are several distinct types of packages available that differ not only in what they do for the user, but in the level of initial customization and follow-up support from the vendor. Experienced package buyers warn the novice to read and understand the terms of any contract or licensing agreement before finalizing the acquisition of any software.

Sold 'As Is'

Some packages are intended to be used "as is." These include delicately devised modifications to the user's operating system,

or better utilities than the user can get from the hardware vendor.

These are never modified to user needs and are generally coded to be operating system release-independent, but are just as commonly updated by the vendor if a new DOS or OS

These changes are seldom major redesigns of the original program logic. In many cases, they are only cosmetic changes, allowing a slightly different input and producing a minor revision in output.

If the vendor offers this type of minor customization at all, it

"... Users are looking for more direct effort on the part of vendors... 'more regular visits by software salesmen' would make them more aware of what is available, and presumably more interested in acquiring part of the action."

release makes a change necessary.

Some vendors offer application packages on this same "as is" basis. If the system defined by the vendor meets the user's needs, this can be a good deal.

These packages are distributed — sometimes by mail — in either source or object form. Source code allows the user to alter the package but most vendors charge extra for this privilege since it effectively exposes any proprietary features they have in the coding.

Cost of this type of package is roughly determined by dividing the development cost by the potential number of users. Thus buying a package is generally going to be less expensive than developing the same application in-house for an installation's own use.

Even if the vendors do not want to modify their basic logic, some vendors — particularly those with payroll packages — do provide on-going updates to maintain such things as tax calculations which are legally binding on the user.

Control Cards

A more sophisticated type of package is designed to be modified by the user through entries on one or more control cards, rather than with "hard coding" of the program itself. These give the user more flexibility, but have their costs, both in dollars and in operating efficiency.

Any program that can adjust itself to a series of control parameters cannot be as efficient as a program built for a specific set of circumstances, a vendor's representative admitted.

Instead of control cards managed by the user, some vendors regularly offer some programmed modifications to their packages to make them more closely tuned to the user's needs.

is usually done at no apparent cost to the user. Obviously, however, the vendor has to pay for whatever work his staff does and the cost of the "free" modification is built into the basic price of the package.

And users will find that only a certain amount of recoding will be provided without adding to the cost of the package.

Skeletons of Logic

Closer yet to full customization are packages that are essentially skeletons of mainline logic

for applications deemed to be crucial to a user's success in business. To these skeletons, the vendor adds all the particulars of logic that make the application sensitive to the user's specific needs.

A variant of this highly customized software involves the stringing together of precoded modules to create the system the user wants. Because of the labor-intensive effort that goes into each installation, these packages cost considerably more than those the user can install "as is." But they are less expensive, and probably more sophisticated (since the vendor has coded the same type of problem many times) than the same application would be if the user wrote it for himself from the ground up.

The vendors of these heavily customized systems typically have a background of consultation work in the particular area or areas covered by their products. These vendors don't try to be generalists, and their follow-up support reflects their concern for their clients.

Packages Are Way to Standardize

(Continued from Page 27)

most, four out of 10 users said documentation. A quarter of the users showed concern for better efficiency, and another 20% called for better "general performance." Maintenance by the vendors was criticized by another 20% of the users, and 18% said they were disappointed, but gave no specific reason.

Both users and non-users apparently compared the offerings of independent suppliers with those of the mainframe makers. A quarter of the DP directors feel the independent products are generally better. Almost 10% of the users said the computer makers' products tended to be too generalized.

Eleven percent of the users preferred to stay with manufacturer software; some pointed out that independents did not offer much to non-IBM users. Other responses to the question indicated that many users have had successful experiences with both independent and manufacturer-supplied software, depending upon the circumstances.

Nice Forecast

Respondants were asked if they felt that, in the long run,

independent software package suppliers were likely to compete successfully against IBM and other computer-mainframe suppliers. The response was overwhelmingly favorable to the independent suppliers, with 86% expecting the independents to succeed in the long run.

Of those who qualified their responses, many suggested that the strength of the independent suppliers lay in the area of specialized applications-oriented packages, with a number of respondents mentioning the need for responsiveness and quality as prerequisites for success.

The few negative responses mentioned the independents' lack of good distribution and stability, insufficient support of packages and difficulty in competing against the vast marketing organizations of mainframe suppliers.

The final report, including a suppliers' survey to complement the users' commentaries, will be ready in late March or early April, according to marketing director Robert Sanzo, and can be ordered from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.



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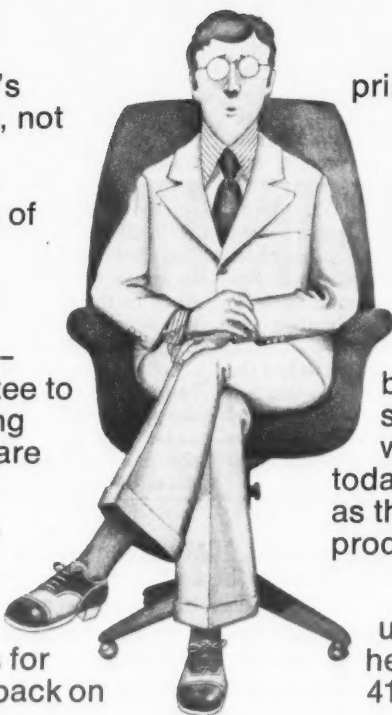
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Planning, Control Keeps Custom Project on Target

University, CPAs Spend Six Months Defining Needs

SOUTH BEND, Ind. — By working closely with its accounting firm and a custom-programming team from Keane Associates, Wellesley, Mass., the University of Notre Dame moved within one year from a "ten-year-old kludge" of an accounting system on a Univac 1107, to an integrated, data base-oriented system on an IBM 370/155.

Much of the groundwork was done, according to the university's DP director Brian Walsh, by Ernst & Ernst, Notre Dame's accountants. The firm recognized that the old system was inadequate for the university's current needs, even if it could be transferred to the new equipment.

A new system had to include Federal government reporting and accounting for the use of restricted funds and for expenses incurred in the completion of research projects, as well as handling other functions that are more like those of any large business.

The system would have to keep a number of sets of "books" through which the university's activities could be properly recorded for a broad range of legitimately interested parties. Cost controls had to cross many departmental boundaries and sometimes, many years.

Ultimately Ernst & Ernst spent \$50,000 and six months designing the different phases needed to bring the system to operational status. The only phase left out of the accountants' plans was actual programming, and that omission was deliberate.

For its part, the university's DP staff put together what Walsh called "vendor specifications" to define the target operational environment for the system. These were, in truth, programming specs that complemented the Ernst & Ernst system specifications.

Restricted to Cobol

The Walsh report called for the use of the IMS/360 data base system and defined how much core would be available for application programs. It restricted the vendor to a straight-laced use of ANS Cobol without, for example, the Report Writer feature which is not implemented universally.

The vendor was also limited to 3330-type disk systems and no more than two tapes, even though the university actually had more tape drives installed.

Keane Associates placed a bid for the programming job and won against competition from IBM's Contract Systems Division and Service Bureau Corp.

The contract was as detailed as the work specifications. It defined the communications, management and control paths to be followed so that progress could be maintained under almost any conceivable circumstances.

Parallel positions on the staffs of the university and Keane were set up so questions could be answered promptly and with authority.

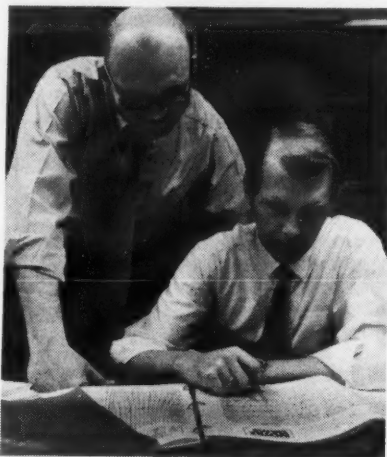
The contract spelled out the testing pattern to be followed, and the details of warranty periods after programs had been accepted. It even named an arbitration authority in case such an extreme measure was needed, but recently Walsh could not even remember what group had been cited for the task.

True Togetherness

The system development was truly a joint effort. At final test sessions for any of the modules or subsystems, everyone at Notre Dame with any accounting responsibility for the work being done had to be physically present and had to sign off those elements of the system that fell within his or her responsibility.

For its part, in addition to the programming, Keane had to train Notre Dame personnel in the intricacies on the IMS data base operations. "I certainly didn't want a 'cold' turnover of responsibility in that area," Walsh noted.

Meanwhile, Ernst & Ernst prepared a new set of specifications, this time covering the human interface with the system that Keane was creating. The new Ernst & Ernst effort documented the non-com-



Keane's project manager Jim Donnelly checks a report layout and Frank Sullivan, a project leader, looks on.

puter accounting procedures and preparation of the documents that would become input transactions.

University employees actually developed much of the routines and forms used in this phase of the project, but Ernst & Ernst personnel were available for help in resolving specific problems.

Walsh gave high marks to Keane for the setting up of six separate data bases under IMS, each of which ultimately will support financial analysis applications in addition to the current accounting system.

Notre Dame is just beginning to feel the impact of the integrated accounting system, he said, noting that the year-end processing has not yet been used in live operation. The university's fiscal year ends in June.

Accounting System Growth Monitored By Manager Pairs

WELLESLEY, Mass. — Many custom-programming situations arise because the user doesn't really know in detail what he wants done, but he hopes the outside analysts and programmers will do what needs to be done anyway, on time and within costs. Consequently, many custom-programming situations turn into disasters.

That was not the case, however, when Keane Associates first became involved with the University of Notre Dame in South Bend, Ind. In fact, Keane found system specifications three feet thick for an integrated financial accounting system geared specifically to the university's peculiar needs.

The firm also found 100 pages of specifications prepared by the Notre Dame DP staff to define the programming environment in which the system was to be implemented. The combination of two sets of specifications, and a well-defined organization to oversee the project turned this into "one of the best projects we've ever handled," Keane's contracting officer Jack Phalen said.

The system specs had been developed jointly by the university and its accounting firm, Phalen was told. They provided a detailed description of a system that would include accounts payable, purchase accounting, journal vouchers and accounting for — and control of — financial grants and restricted funds.

All anticipated inputs and reports were specified. A number of functional modules were defined but these only spelled out the processing steps needed to accomplish certain goals, not how the programming had to be done.

Responsibility Defined

Keane was given the responsibility of determining whether to handle the work in one or several programs. Likewise, file content was closely defined, but the choice of access method, file organization and physical device was left to Keane.

In his specifications, Notre Dame's project manager Brian Walsh called for the system to be implemented using IBM's Information Management System (IMS/360), and Keane's project manager Jim Donnelly gives Walsh great credit for this decision.

Notre Dame had previously decided to use IMS on its newly installed 370/155. The Keane project was the first major one to go on the new equipment and Walsh stuck to the choice of IMS even though it was not necessarily the best technique for the current operation, Donnelly said.

Notre Dame personnel were extremely helpful in working out any ambiguities in the specifications, perhaps, he added, because they knew they didn't have to do the programming, no matter how much detail they really wanted.

By the same token, Keane won the right to work back at its corporate headquarters rather than in South Bend, arguing that any inconvenience to Notre Dame would be more than offset by elimination of the cost of travel and living expenses if the 13 people Keane had on the project had to work in Indiana.

Control was crucial to the project and everyone knew it. Before any programming was done, Walsh and Phalen read and initialed each page of the system specifications, signifying that at least to them there were no ambiguities. Once programming got underway, a management committee made up of top accounting and DP people from Keane and the university met weekly to review progress.

The review meetings also helped to establish responsibilities. Keane had the job, for example, of determining which of the IMS features to use, and to show the university how to use them, but it was up to Notre Dame to get the IMS software and to get it properly on the 370.

Notre Dame supplied the test data and each piece of the program was tested as it was completed, first in Wellesley and then in South Bend. Both parties had to "sign off" on the test results, Donnelly noted, and he was generally the Keane representative who carried the programs between Indiana and Massachusetts.

The university and the software house made a clear distinction between logical and financial problems related to the project. When a logical problem arose, Phalen and Walsh would decide how it was to be handled, and leave to another matched pair of contract officers the question of what charges, if any, should be made for the change.

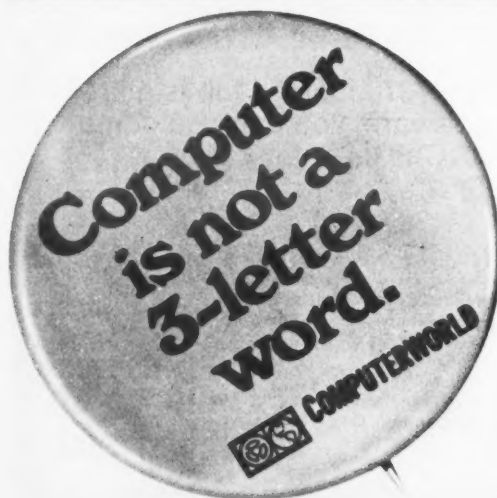
Under that separation of what to do and how much to charge for it, Phalen noted, there was only about \$500 worth of authorized changes in the development of the nearly \$200,000 system.

The system Donnelly and his team have built for and with Notre Dame is essentially a self-contained system, working from no more than nine types of input transactions.

The system provides a full audit trail of generated transactions as well as those entered by the user, and Donnelly is obviously proud of the way it operates. "It's a Cadillac system," he said, summing up the feelings of the entire team.



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People's Problem:**'Writer' Use Swamps DP Staff**

WASHINGTON, D.C. — A local user has found that the unrestricted availability of a "free-form English, designed for the nonprofessional" retrieval/report writer programs, can cause more problems than it solves.

People's Drug Stores Inc. began looking at report writers two-and-a-half years ago when a tight budget limited its programming staff. "If managers could whip up their own special programs, we could handle the regular work. That, at least, was the idea," explained DP manager Ron Compton.

People's expanded its DP equipment from an original 1401, through several 360s, and recently acquired a 370/145. The workload on the programming staff has increased in similar steps, Compton noted.

To get some of the unexpected reports handled by the end users, he looked at several retrieval/writer systems, but was discouraged to find most priced from \$10,000 to \$20,000. He decided to take a chance on a much less expensive package called Easytrieve, from Ribek

Corp., Silver Spring, Md.

Within months, Compton said, even top management was using the system and expecting results in minutes or hours, rather than the days or weeks they'd faced before. Service was so good that requests for special reports were taking more time than the regular work.

Finally, People's reversed its approach, pulled the Easytrieve capabilities back into the programming department and assigned one specialist to work with the system.

This brought some order to the flood of requests and enabled the regular programmers to consider Easytrieve for some of the normal applications. Compton calls it a "very powerful" program that can often avoid the

use of Cobol or Assembly Language.

People's uses Easytrieve in payroll processing, inventory control and sales management, as well as in store transfers. Accounts receivable and accounts payable and much of People's financial reporting are also handled by Easytrieve coding, Compton added.

Bob Lloyd, programming manager at People's, noted several minor problems with the system; coding errors are flagged but execution is not halted and one of the options requires dummy record creation before it functions properly.

But these problems won't stop Lloyd from using the package. "We're going to run the hell out of it," he said recently.

'Soul Searching' Pays Off

MORRIS PLAINS, N.J. — The user should always check out the financial stability of any software vendor whose package is being considered. Everyone knows that; it's one of the rules that shows up on every list of do's and don'ts. But rules are made to be broken.

Warner Lambert found itself in a "unique position," DP manager Joe Donia said. The company had decided to use Management Sciences of America's (MSA) payroll package but about a week later the vendor declared bankruptcy.

That news gave Donia pause to think. "We did a good bit of soul searching" and then checked the contract carefully to see what liability there was for Warner Lambert and for MSA. It looked as if Warner Lambert was "pretty clean," Donia said. "The only way we could get hurt seemed to be in the area of support."

"So we decided to 'bite the bullet' and go in with the package anyway and," he added, "we've been very pleased."

Despite the long reorganization process (under which MSA recently came out of bankruptcy) "we never missed a beat," Donia said. "If I hadn't read about MSA's troubles in the newspapers, or if they hadn't told me about them themselves, I'd never have known about them."

Support was good during the bankruptcy and continues to be good now, Donia said. Warner Lambert has in fact installed the package in three other data centers in addition to the corporate location here.

About the Author

This special report was prepared by CW Software Editor Don Leavitt, who has been responsible for the Software/Services and Education sections of the newspaper since March 1970.

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Maturing DP Manager Finds:

Cost-Consciousness Leads to Package Use

DP managers — and higher level corporate managers to whom they report — are much wiser than they were five years ago. Even those installations that didn't exist then (shops based on System/3s) are sharper, more concerned about their operations and more cost-conscious than comparably sized installations of the mid-sixties.

The still-growing sophistication is seen clearly in the number of installations that have gone to outside sources for disks, tapes and — particularly in the past half year — add-on or replacement core. On the software side, this sophistication is seen in the growing number of installations using packaged enhancements to the IBM-supplied operating systems.

Whether or not users add extra zip or new features to the system software, they are also beginning to recognize that the computer must do more to justify its presence. They are beginning more and

more to consider the use of application packages or custom programming to get a job up and running quickly and cleanly.

In Their Wisdom

But decision-makers are human and the new-found wisdom is often applied in specific situations in diverse and contradictory ways.

"Why did you buy a payroll package?" "That's easy. We tried to write our own."

That exchange between *Computerworld* and Ralph Fiorillo, manager of current systems for Avon Products (which acquired PHI's payroll system almost two years ago), illustrates the logic of many package users. The purchased package provides them with capabilities they felt they could not effectively create in-house.

Irving Trust's John Bunting neatly summed up an attitude worlds apart from

Fiorillo's, but one that is also common, when he said, "Yes, we use PHI's package, but — like most packages — it doesn't really meet the requirements of our standards, so I doubt we'll get very many more application packages."

It would be wrong, he noted, to require programming generated internally to meet the standards, if they are to be waived when looking outside for additional programs.

A third view of packages came from William Dawson, vice-president of Girard Bank. He considers requests from end-user departments for work to be done, and matches the requests against a catalog of packages known to be available. The user department is asked to modify its specifications if a package can't be found to match the original request.

Help!

All three attitudes show a similarity in

"Users now recognize that there is a cost to software, and as long as they have to pay someone, they might as well look around and see who's best."

willingness to look for help. Fiorillo pointed to the problems of attempting to maintain a multistate payroll system as justification enough to go to a vendor who can spread the updating cost across many users.

Dawson's approach seems to be gaining favor among many users: unless there are absolute and overriding circumstances, there is no reason to "scratch-build" a system that is very close to one already available. And it is ludicrous to consider modifying an operational application to meet some realistically unnecessary requirement.

Bunting's remarks pointed to another element in the sophistication of users. They see the need for order and standardization in all their work, even if it means that packages may be ruled out by the standards. That loss is more than made up by the control the standards provide overall.

'Not Invented Here'

All three attitudes suggest strongly the crumbling and in many cases utter collapse of the "Not Invented Here" syndrome that led DP managers of the 1960s to disregard any software that wasn't created in-house or supplied by the main-frame maker.

Users are now looking carefully and buying, if they are convinced they can save time, equipment or staff expenses, or gain a capability they could not develop in-house as cheaply as they can buy it.

This growing maturity is the result of a combination of factors. The simplest one, perhaps, is that many installations have been up and running long enough so that both DP and corporate management have put aside their rose-colored glasses.

They want the expected results on time and within budget. They are comparing notes with others in their industry and with others using the same software, to improve their own operations.

The IBM unbundling of software program products, now nearly four years old, is beginning to have its effect as installations outgrow the "freebies" they've been using. They now recognize that there is a cost to software, and as long as they have to pay someone, they might as well look around and see who's best.

Extra Pressure

The general downturn in the nation's economy added an extra layer of pressure on the DP manager to find the best way to utilize his existing equipment. Although the DP department wasn't the only one to feel this need to cost-justify its existence, it may have been more sensitive to the pressure than other more traditional departments within an organization.

Until general management really felt the dollar crunch, DP had too often maintained its privileged, almost mystical position, getting anything — in terms of staff and/or equipment — the DP manager requested.

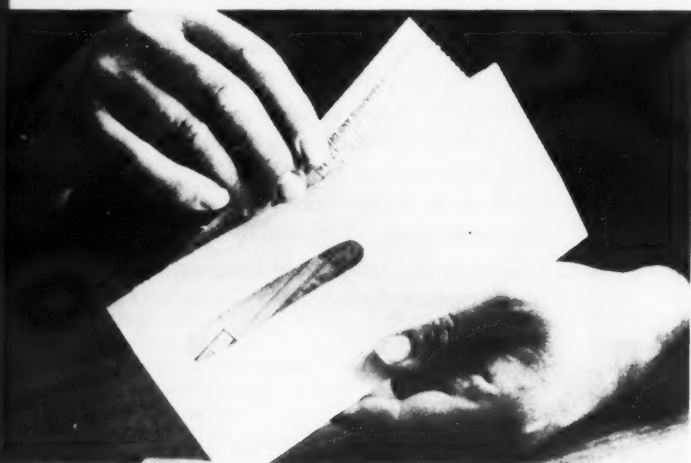
Now he has hardware options to cut back equipment expenses, or at least control their growth. He has seen system software support which, if used well, can delay for long periods what seemed inevitable hardware upgrades.

And he is looking at applications packages to save his in-house staff for projects that can't be handled by outside help. The only problem lies in the fact that there are packages . . . and there are packages.

"'Package' is a good term for programs you can get from outside vendors," Alex Bender of Maxim Data Systems said. "Some come in plain brown envelopes; other are almost literally gift-wrapped. It's tough to know what is in the first kind; you've got to watch for strings attached to the others."

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Programming Methods 'Waste Time, Talent'

ENCINO, Calif. — "I really think almost everything that is done in the field is wrong," said Joseph Sider, an independent DP consultant who thrives on solving other people's problems.

Most installations can improve their operations sharply if they would honestly recognize the root problem: programmers and analysts spend too much time doing clerical work and, as often as not, installations don't even see the waste of talent involved.

But there is no magic cure for the problem. As far as Sider is concerned, each user has to do his own housecleaning, and the sooner the better. He does believe, however, that IBM is on the right track with its interest in lead programmer and team concepts.

Each development group should be as small as possible while still allowing a division of duties. If each group includes a leader, a junior programmer and a programming secretary, Sider said, work can get done efficiently. "The leader doesn't have to be great," he noted, "but he has to understand the total project."

He said he has been talking about this approach for twenty years "and it works. It works beautifully."

Coding shouldn't take vast amounts of time. Most systems are built around a series of basic functions and these can be, and should be, developed as subroutines that can be carried from job to job, he said.

Use Your Library

Sider noted that when he starts a new project, he doesn't take a complete canned program and modify it for the particular implementation. Instead, he uses a library of existing subroutines.

"I write a mainline and CALL these subroutines. They're already in object code so I don't even have to reassemble anything. I have the coding in core, just like an extension of the supervisor," he explained.

The function subroutines can ease program maintenance as well, he said. If common logic is used throughout an installation, any programmer can update any program whether he's seen it before or not. He may not even know which programs he wrote, and which the other programmers wrote.

Great Potential Wasted

Sider maintains that most system designs are little more than carryovers from tab days, with no real thought to the capabilities of the system software now available. Most people don't realize the great potential of variable-length records, but 99% of all applications can use them to advantage, he said.

With variable records, for example, users are freer to add new fields or include new record types on a file, without disturbing the basic program logic. The I/O control systems within today's operating systems cope with all the accessing problems; all the programmer has to do is use the data, Sider said.

Programmers should let keypunch operators, programming secretaries and console operators do their special things, and avoid a great deal of clerical work for which they are untrained. Without such help, Sider remarked, "programmers are getting a hell of a lot of money for their incompetence."

Coming under especially heavy attack by Sider is the way most installations handle test sessions, with programmers "waiting around for hours" and then taking a half-hour or longer on a single shot. Done right, he added, the typical test should take only 30 seconds and require minimal set-up time.

(Continued on Page 36)

Packages Get Bank Center Moving

LAWRENCE, Mass. — Some users have the knack of putting the work of many others together in a way that results in a stronger DP operation than if they had depended on their own programming skills alone. Such is the case of Bay State National Bank.

The bank has a data center geared to serving a variety of clients, both in general business and in the financial industry. A far cry from conventional, conservative bank management stereotypes, Bay State's leadership is willing to do anything reasonable in hardware or software to improve the center's operations.

The hardware at the center, for example, is a 360/30, but only 32K out of the total 96K bytes of memory on the system are from IBM. The rest came from Cambridge Memories. I/O peripherals now include Storage Technology tape drives and Calcomp disk units.

It is in software, however, that Bay State shows its willingness to shop around for the best systems. The "best systems," according to DP director Burt Hickman, are fundamental, "unfrilly" packages that can be modified by the bank's six-man programming staff.

Current general-business applications include accounts receivable and accounts payable, sales analysis and payroll, as well as "raw" inventory control. Hickman's crew is develop-

ing an on-line general ledger system, including responsibility accounting.

In banking, the center provides demand deposit (checking accounts, to the layman); savings; installment loan and certificate of deposit accounting. Account reconciliation, shareholder accounting and financial dealers' "floor plan" loan processing are also available at Bay State.

To put together this collection of services, Hickman and Bay State went to many vendors. The accounts receivable work, for example, is being handled by the AR/70 package from Computer Systems and Education Corp.

The payroll processing is done with a package from Information Laboratories, and the inventory control is managed by a system from Techgenics. Both of these vendors are from Wakefield, Mass., Hickman noted. The audio-response software comes from System Associates, Inc., Reading, Pa., he added.

Most of the banking applications — DDA, savings, installment loans, certificates of deposit and dealers' floor plan loans — come from Florida Software Services.

As long as there are working programs around that will do what Bay State wants to do, Hickman concluded, there is no real justification for his staff's spending time to build from the ground up.



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Good User Should Be Willing to Compromise

PHILADELPHIA — Carefully chosen application packages can solve many problems. But more importantly, according to William Dawson, vice-president for DP at Girard Bank and Trust Co., packages won't create new problems if the controlling DP department takes a hard line with both the vendor and using department.

Girard has a pair of 370/155 mainframes and a DP staff of about 200, including operators. Along with several DP-intended packages, the bank expects to have "half a dozen or more" application-oriented packages in use by the end of the year.

Each of these packages has been or will be selected, Dawson explained, to answer a request from a non-DP using department to have a particular function made available on the computer.

In many cases, the in-house staff could handle the request. But if the user wants the function so badly he can't wait to have it developed in-house, "he should be willing to bend somewhat" on specific details if an available package otherwise seems to fit his needs, Dawson said.

Vendor Makes Changes

By contrast, the bank itself is unwilling to undertake any modifications of a package's coding, to make it work according to the user specs. Instead, even if it adds to the cost of the package, Girard requires the vendor to make any desired changes, and to make them before an extensive acceptance test.

That approach, Dawson said, cuts down on the number of changes requested and avoids any finger-pointing complications between Dawson's organization and the using department, once the package is being tested and after it has been installed.

Despite the size of its DP staff, Girard is utilizing packages as often as possible to meet user requests, because the bank wants to go to a data base operation, with IMS/360. Dawson doesn't want to spend a lot of his staff's time developing application systems that will only have a

short life anyway.

Once Dawson's department gets a request from a potential user, it checks to see if the capabilities wanted are already available through a currently operational program. After that, the department checks *ICP Quarterly* to see what packages are available from outside sources.

When a package is found that seems to both provide the function wanted by the user and meet the DP techniques Girard utilizes, a meeting is held with the user and the DP staff to make sure the package is acceptable to both.

User Should Adjust

Almost by definition, a package is designed to work in a particular way and excessive changes could destroy that basic logic, Dawson noted. That being the case, the user should be able

to change his approach more easily than the vendor can alter his logic, to make a proposed package acceptable.

Girard isn't especially interested in "free" trial periods, the vice-president said. Instead it pays 10% of the cost when a package is selected. It then runs an acceptance test to get a more detailed understanding of how the package works.

If the test is successful and any required changes are completed within 60 days, Girard pays the rest. If not, he doesn't. Some vendors go along with this policy and some don't, Dawson admitted.

Girard is currently using Mark IV from Informatics, and the Results package from University Computing, as well as a Bond Portfolio management system from Warrington. PHI's payroll has been used for some time and

"We try to be careful in the [package] selection process and the results show we are succeeding." — William Dawson

was recently upgraded to OS.

A time deposit system from Computing & Software, and a fixed asset accounting package from a Minneapolis firm are also operational, Dawson said. An installment loan system will probably be selected and installed shortly, he added.

The Paces job accounting package distributed by Pace Applied Technology is also in use, in direct support of the DP operation itself, he noted.

The bank had no problems with any of these packages after they were installed and that came as no surprise to Dawson. "We try to be careful in the selection process, and the results show we are succeeding," he concluded.

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'Great Innovative Tool'

Non-DPers Using T/S 'Without Hassle'

LA GRANGE, Ill. — Grayhill Inc. has an in-house IBM System 3/10 that is being used for conventional batch-oriented accounting applications, but a whole range of innovative work is being done at the same time by middle-level managers working through a time-sharing ter-

minal, "without hassling the DP staff at all," according to materials manager Dale Colosky.

The 3/10 — programmed by DP Manager C.P. Quinn and an assistant — handles payroll, general ledger, accounts receivables and aged trial balances, and other "history-oriented" applications for this company, which assembles rotary and push-button switches, largely on a special-order basis.

Various production-oriented applications are already operational on the terminal which is linked to the Computer Science Corp. (CSC) time-sharing service. Almost more important than that, however, is the fact that non-DP managers have been encouraged to try new things on it, and the results have been good, Colosky said.

"Anyone with any kind of wild idea that might help the company can spend a few bucks and play" on the terminal, he explained. "If the idea then seems like something Grayhill wants, the manager can work with it,

change it any way he wants without disturbing anyone else.

"When we get something beneficial and that is making us money, we can consider converting it to in-house and save the time-sharing money."

Work being moved to the 3/10 now has to be converted to batch processing but if the use of applications that are "natural to run on time-shared mode" grows, Colosky hopes the company will acquire that facility in-house.

In the Beginning

Grayhill got into time-sharing and the use of the CSC services three and a half years ago, he said, because management wanted a quick way to compile data and compute work standards appropriate to the company's job-shop type of environment.

CSC's custom programming group helped develop the programs Colosky needed, using classic Methods and Time Mea-

(Continued on Page 38)

Sider Cites Sins of Systems

(Continued from Page 35)

Programmers should get 10 shots a day, if they need them, and this function should have the highest priority in the shop. This would only be possible, he continued, if the programmer sticks to programming and lets the programming secretary run the tests.

As soon as he has solved a problem, the programmer should turn the project over to the secretary who — ideally — should be able to gather or plan the test data and anything else required, and then submit the job for testing.

Use of patching — even in Cobol — is a must if the quick tests are not to be bogged down with long compilations. But patching should be dynamic so that the basic stored object code always matches the latest program listing.

As soon as a patch is checked out and the logic is to be added to the program, the programming secretary should update the source code, Sider explained.

Test sessions should be based on data generated on the spot, so there is no need to mount

special files, and they should include automatic dumping of user-defined critical areas, so that the operator is not responsible for taking tape or core dumps with conventional utilities.

Systems should be designed to be simple to run. "All the thinking should be done away from the machine," Sider said, adding, "don't depend on the operator not to make mistakes. He is human and he will slip up once in a while." The system should be able to catch these errors.

In the same vein, he noted that conversion of data to a new system represents a lot of effort, and that even though people try to do everything right, they may make mistakes.

Under normal file maintenance, once an application is up and running, the system "should allow the people to do anything they could do by hand" to update the records. If authorized, they should have the ability to look at any part of the file and make changes. The system should be geared to report the changes so that an audit trail is available.

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Contract Details Called Vital And Impact Must Be Understood

By L.A. Welke

Special to Computerworld

After five years of experience, software buyers and sellers have finally resolved many of the difficulties of contracting for "packages." The lack of legal, tax and accounting definitions for software notwithstanding, more than \$200 million of proprietary software was purchased last year. That's double the sales of 1971 and four times the sales of 1970.

And while the specific terms and conditions might have been different for each item bought, the general pattern takes the following points into consideration.

Proprietary software, with the exception of accidental sales by incidental sellers, is not sold but rather is leased or offered under a "license to use" for a specified period of time, usually three to five years. Some use a "lease in perpetuity" meaning the user has the software forever.

Additionally, about 15% of the indepen-

dent software vendors offer monthly terms leading to a full payout lease or simply rent their products with a 30 day cancellation notice.

At any rate, title does not transfer, usage may be restricted to a given geographic location or specific installation, and the necessary clauses to protect under trade secret law are usually invoked.

All of this is due in part to the Supreme Court's narrow decision on the Benson-Tabbott patentability case, and in part to the intangible nature of the software product itself. The case for patentability may be argued for the next five years before anything is decided; meanwhile, it seems obvious that the marketplace will progress quite nicely with trade secret protection.

Trade secret protection requires a non-disclosure clause in the contract - something that allows the buyer and his employees to use the product but not to give away the processing algorithm, documentation or anything else indigenous to that program product.

Most system software and what might be termed data processing aids are offered only in object code form - source never leaves the seller - which is one additional way to protect proprietary software.

And in the final analysis, new versions and releases of the hardware manufacturers' operating systems provide a kind of reverse protection in themselves.

Probably the most important section of the contract is the bill of particulars that specifies exactly what is being leased. This should specify the media of the program being purchased, the type and quantity of documentation included, the type and amount of training, conversion and installation assistance provided, and the specific modules and options being purchased in addition to the basic system.

If a time schedule of events is not an integral part of the contract, it should be a supplement to the contract. The important thing to remember is that any materials to be transferred from seller to buyer should be specified in writing.

That, in turn, raises the question of delivery and payment, one usually being related to the other. Delivery of software is not a simple, straightforward process; it can be construed to be when the documentation arrives, when the training is performed, when the system is put up, when the program product is first used, or even 30 days after it is deemed "operational." The important thing is to have both buyer and seller agree - in writing - to whatever it is.

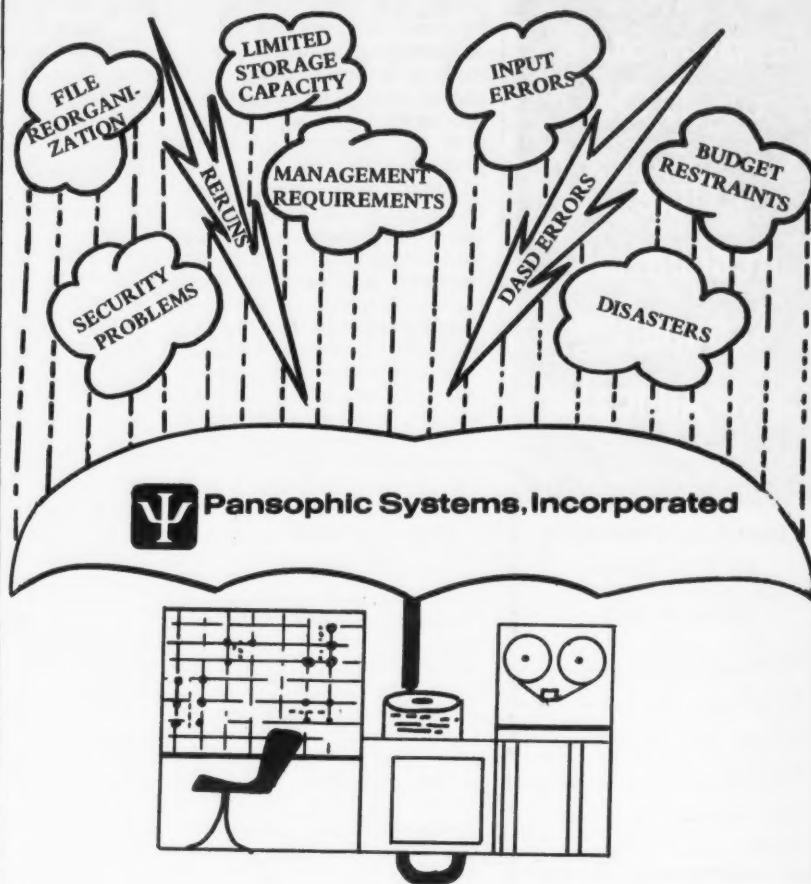
Lastly, the majority of proprietary software is warranted, usually for six months to a year. During this time, the seller will repair all defects (if any) and, additionally, might make any operating system revision upgrades or enhancements, at his own expense. Then again, he might not. The experienced buyer should seek a clear statement of definition for warranty.

And the experienced buyer will also want to know what happens at the end of the warranty period. Invariably the software seller will offer an annual maintenance agreement, at a charge that varies from 3% to 14% of the face value of the lease contract with an average of about 9% to 10%.

Because a maintenance agreement relieves the buyer of maintenance programming and at the same time allows him to benefit from any enhancements suggested by the other users of the same package, a maintenance agreement is invariably a smart buy.

In general, a knowledgeable software buyer need do no more than exercise good business judgment in contracting for proprietary software.

Welke is president of International Computer Programs Inc., and publisher of the ICP Quarterly review of commercially available software.



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T/S Saves Small Office Move to Computer

PHOENIX — A time-sharing service may be the best choice for a small company that "has to do something" to improve on its outdated manual operations but doesn't want a lot of in-house equipment. That at least has been the experience of Fiberglass Fabricators, Inc.

Things were going along quietly, according to administrative assistant Lois Cassidy until the company added bathroom fixtures to its product line about two years ago. Then sales volumes expanded so they couldn't be handled adequately by hand.

The company wanted to maintain complete control of its operations, so releasing its invoices to a service bureau for batch processing was ruled out, she said. And with a one-girl office, an in-house computer was more than she could handle.

The Solution

"We heard about Computer Resources Services (CRS) (a local affiliate of Leasco Response) and asked them to come down," she added. This initial contact led to the installation of a teletypewriter and the use of both "canned" and custom-written applications from CRS.

Fiberglass started with a standard payroll package, and "it was hard at first" getting used to doing things the way someone

else wanted them done, but it was worth it," Cassidy said. The only thing the company had to do — besides entering data the way the program wanted it — was to supply the continuous form checks.

"At first we didn't even do that. The 'checks' were printed on stock teletypewriter paper and someone retyped the information onto individual checks that were still in stock," she admitted rather sheepishly.

From payroll processing, Fiberglass went into accounts receivable work, based on a system written by CRS. Leasco has a receivables system available to its users but Cassidy said it was "much too complicated" for her small operation. It would have been quicker to continue the manual operation than to go with the complete Leasco approach, she estimated.

A Little Alteration

The company has been using the general ledger system developed by Leasco and that is "my favorite of all," according to Cassidy. "I can do in two hours what could, with mistakes, conceivably take me three days." CRS and Fiberglass apparently had to do some slight tailoring to meet the company's specific needs, but essentially the package was used "as is."

Monthly inventory accounting has also been run on the teletypewriter and that is "another good one," Cassidy said. The company has four primary supplies but also many, many small fittings and parts, particularly since Fiberglass entered the bathroom fixture market.

Cassidy uses an accounting package called Scribe to maintain the inventory records. Written by CRS or Leasco, Scribe takes all the quantities Cassidy feeds it and handles all the math needed to evaluate the stock on-hand or on-order.

Through CRS, Fiberglass also has access to the whole library of programs Leasco provides for "engineering and algebra and stuff," but Cassidy indicated the company isn't using those facilities with any degree of regularity. She has no background in programming and when she starts working in Basic, she makes mistakes and gets diagnostic messages that "no one at CRS or anywhere around here" has ever seen before.

Rather than depend on her own skills, she is very high on the support CRS and especially Kendall Johnson, one of the CRS owners, have provided. "At least for the beginner, Kendall Johnson is what makes time-sharing work," she explained.

He not only wrote the receivables system for Fiberglass, but Johnson — or one of his crew — makes himself available when and if Cassidy has a problem. This degree of support might not be available to all time-sharing users, she noted, and is practically possible only because both CRS and Fiberglass are in

Phoenix.

She said she has had no major problems since going to CRS but that there is one peculiarity of T/S, in contrast to machine accounting, that does confuse some teletypewriter operators. The terminal responds so quickly and, usually, so coherently that the operators forget it is all part of a machine.

"Girls I have trained tend to regard it (the teletypewriter) as a person. They forget they have to tell it exactly what to do," she said. It takes a very specific kind of person, one with a lot of patience, to work with a terminal.

The teletypewriter (actually the computer behind the terminal) is very literal. "If you put something in wrong, you'll get it out wrong," she said, rephrasing the classic DP problem of "garbage in/garbage out."

The relationship between CRS, the terminal and Fiberglass has apparently been very satisfying and effective. Cassidy reported that just recently a salesman for a small in-house business system stopped by, "but the mere thought of having to handle all those cards, having to worry about machine maintenance and all those things, just left us completely cold."

Fiberglass is a small, custom shop that has to be flexible enough to react to a stream of situations, each of which is completely different from the previous one. That is why Cassidy felt the canned Leasco receivables system was wrong for Fiberglass, and the custom-built system was right.

T/S-Based Ideas Spark Grayhill

(Continued from Page 36)

surement (MTM) techniques. Then "as long as we had the standards, we figured we might as well use them" so the company and the CSC people wrote some productivity reporting routines "and other miscellaneous junk," Colosky went on.

The "junk" — in addition to weekly production reporting — includes a mark-sense-based application for shop floor control. To gather input on a timely basis, Grayhill has an MDR unit hooked up to the terminal. This permits the easy reporting of the location of every job in the shop on a daily basis.

Another "handy tool," he noted, has been the use of Pert programming to get a good handle on special projects.

Inventory control is a tough problem for a custom shop like

Grayhill, but the company decided that it would be worth whatever it might cost. And, Colosky said, the decision was a good one.

Based on an off-the-shelf application system that was in the CSC library, inventory control was installed just when Grayhill and the rest of the industry had a lull in business. "It seemed odd spending money instead of conserving it, but it turned out to be a good deal," he said, noting that in the year after the lull, business was up 40% "but the cost of control hasn't jumped a penny."

Grayhill has been spending a little more than the \$1,500/mo minimum charge for the inventory control package, and between \$600/mo and \$700/mo on the "develop your own/run your own" type service.

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Source Transliteration to Test Run

Conversion Task Proves Easy Sailing With 'Passport'

FULLERTON, Calif. — Often the major problem facing a user is one of getting new applications operational on installed equipment. Sometimes, however — as in the case of Hughes Aircraft Co. — the problem is one of getting existing applications operational on new equipment.

During the past year, the aerospace giant has been consolidating its DP operations, and as part of the effort, was faced with the task of converting Fortran programs from a GE (now Honeywell) 635 configuration to a dual 370/165 setup. Hughes had some 400 to 500 programmers and estimates indicated it might take an average of a week per program to do the conversion manually.

No one knew exactly how many programs had to be converted, and in some respects the count is still unclear. But when Creative Computing Techniques (CCT) proposed using its Passport system to handle the work, there appeared to be "above 400 and below 2,500 programs," according to Kevin Welch of CCT.

Passport provided mechanized, computer-based solutions to specific conversion problems, and relieved the Hughes programmers of about half the manual effort.

"In effect, Passport did — in minutes — what a programmer might take three days to do manually," Welch said. The system operates on a load-and-go basis, from source transliteration through program test run.

The ease with which Passport

can be used is, in fact, one of the reasons the number of programs to be converted was in doubt. When the scheme was first proposed, the Hughes DPs tended to hold back, perhaps for fear of cost, perhaps out of concern for the safety of their original source decks.

Now, however, they are digging out more and more programs that "might as well be converted," Welch noted.

Three Basic Steps

Functionally, Passport is a 370-based software system that accepts GE 635 Fortran source decks and test data as input. It performs three basic conversion steps, followed by Fortran Level G compilation and link-edit steps, and climaxed, if possible, by a GO step for a program test.

At the end of either the compilation or test step, the user has a new source deck and listings to indicate what work, if any, still has to be done by the programmer to make the program operate properly.

The output consists of an IBM 370 job control deck, including certain JCL cards as well as a transliterated and partially converted Fortran source deck and transliterated data cards. Some of the original GE 635 source code does not require any conversion, CCT noted.

A Passport run also generates a listing of the changes made to the GE 635 source deck, the GE 635 control cards and the printout produced by the Fortran G compiler and linkage editor, along with all appropriate diagnostics.

If a load module is successfully produced and a GO step initiated, further diagnostic messages may be generated, in addition to partial or complete test results. Finally, a concordance is produced, tabulating each occurrence of every identifier and every constant appearing in the output Fortran source deck.

Transliteration, or the replacement

ment of characters unacceptable to the 370, is a key step in the Passport conversion process. A single table is used to convert input punches to output punches. The table accepts input from the IBM character set, the GE 635 set, Ebcidic or any combination of the three, Welch said.

Ebcidic Output

Output is always Ebcidic but certain input characters — particularly in the IBM character set — are not transliterated properly, Welch acknowledged. All characters from the normal GE 635 set are handled correctly, he added.

In other conversion areas, Passport bypasses Gecos control cards, or converts them to Fortran comment cards, where they occur within or between programs. The system also generates prototype IBM JCL cards which the user must later modify for production runs.

Within the program coding itself, Passport zero-fills null arguments, inserts the Continue line required after a DO loop which terminates on a Logical IF statement, and converts basic real constants to double-precision constants. In fact, Passport documentation notes 21 specific points of conversion handled by the system.

Real Timesaver

The conversion logic and the automatic test appear to speed program changeover impressively. In one test, Passport enabled a program to run to normal completion, with 100% conversion, in 40 minutes of computer time, and two compiles.

Without Passport, the same conversion required 12 hours of computer time and three compiles, CCT said.

As installed at Hughes, Passport required about 225K bytes of storage. Because the number of programs to be converted is still unknown, the service is being priced on a per-program basis, a company spokesman noted.

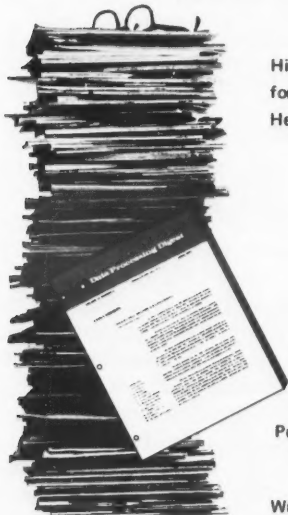
The logic used in the Hughes GE 635-IBM 370 implementation of Passport has also been utilized with other source/target combinations, he added.

CCT is at 6980 J Knott Ave., Buena Park, Calif. 90620.



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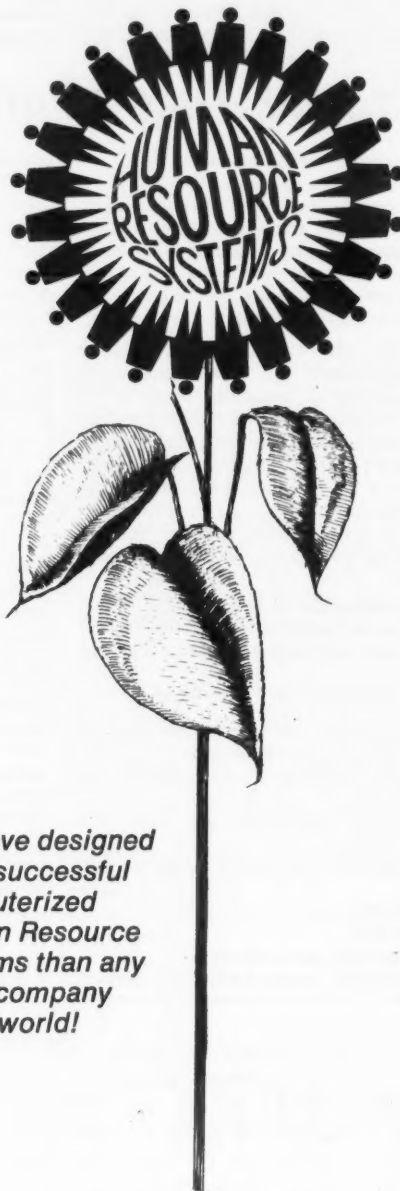
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Reduce Development Costs

Future Software May Obsolete Program Techniques

By Martin A. Goetz

Special to Computerworld

Future systems software product innovations will drastically affect the very structure of programming — i.e., how programs are developed and maintained. The way we program today should be obsolete within five to seven years.

Programmers, of course, will still be needed and well paid, but the new software that will become available will change his role. New system software packages will be available to significantly improve the reliability and quality of a programming effort, while simultaneously reducing the cost.

The programmer will also have available even higher-level languages than Cobol or Fortran, as well as radically new programming tools. The overall results should be a reduction in program development costs by 50% or more.

Software product sales (exclusive of IBM) in the United States during 1972 exceeded \$200 million. Further forecasts estimate such sales will exceed \$300 million in 1973, and will reach the \$1 billion level by 1976 or 1977.

In the opinion of many in the industry, the largest growth potential lies in the area of packaged software.

The area of custom programming, on the other hand, will probably show relatively little growth, but should continue to produce revenues in the current \$200 to \$300 million range. This segment of the industry will continue to be dominated by local and regional companies similar to the more than 500 service bureaus currently scattered across the nation.

Today's Industry

There are a great number of organizations developing packaged software today — some "seriously" and others merely as a by-product of their internal data processing activities.

The independent software companies have established an enviable record over the last several years. Their products are innovative, well-supported and well-documented. Since they are in the software business for profit, they are well aware that their products must be superior to their competition.

A good percentage of the products still on the market today have survived the economic "trial by fire" of the early 70s when many of the inferior quality software houses were folding.

Growing Pains

Both systems software and applications packages will see tremendous growth during the next 10 years. Although data processing managers are finally beginning to buy more software packages, still less than 1% of the potential market has been captured. This situation is rapidly changing.

In the first place, today's relatively healthy economy has enabled data pro-

cessing managers to investigate new programming developments. Application and system software packages that can improve programmer productivity or reduce the time to get an application operational are now very much in demand. In addition, there is again a shortage of programmers which makes commercial packages

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even more attractive.

Secondly, IBM has paved the way toward making unbundled program products an acceptable method of doing business.

Lastly, the data processing manager today is facing his greatest personal crisis. He is finally taking his appropriate place within the management ranks and, like every other manager, is finding that he must either shape up or get out.

Historically, most successful software products cost from \$100,000 to \$1 million and more to develop and maintain.

Furthermore, it is often highly unlikely that the user has available the necessary technological expertise. Even if he can develop the product, the time and cost to

document and maintain it are prohibitive.

Even more important, buying commercial software allows the DP manager to free his personnel to perform the more critical data processing activities unique to his particular installation.

Tomorrow's Industry

The key to success may lie in defining the fine line between developing an application package that is either so generalized that it is impractical to build, or one which is so restricted that it is virtually unmarketable. As an example, perhaps applications packages should be developed which can accomplish 75% of a generalized requirement, and which include innate facilities for customizing to individual user specifications.

The duplication of effort which occurs when several companies within a similar industry develop payroll systems, order entry systems, inventory control systems, etc., is appalling. To avoid this waste, new technology is required to develop commercially available products to perform commonly needed functions.

The prime source of such technology will undoubtedly be the independent software companies. Tomorrow's programmer may be spending a good percentage of his time in customizing appli-

cation packages purchased from an outside source.

Given a healthy competitive environment IBM's domination over the software products industry may soon begin to decline. The software products industry, most probably, will not be dominated by any one company. There will probably be hundreds of smaller independent software companies involved in various fields of specialization within the total industry.

'Name Brands' in Software

As the entire software industry grows, it is inevitable that certain products will become recognized as leaders — i.e., trade names, or brand names, will become synonymous with quality software.

To date, IBM products have not succeeded in becoming the brand names for quality. In fact, several independents' products have come closer to being a DP "household word," since these companies basically have specialized in relatively restricted areas of expertise.

It is even possible that IBM will become "Brand X" in the software products market.

Martin Goetz is vice-president, Applied Data Research, Inc. and president, Adapso/Software Industry Association.

In-House Time-Sharing Can Be Costly, Complex

By Richard L. Crandall

Special to Computerworld

Today, as on-line computing continues to revolutionize the use and availability of computer power, many users have begun to identify the value of time-sharing with the means, or hardware, by which it is made available.

However, the creation of an in-house T/S organization can be a complex and costly endeavor, requiring both an in-depth knowledge of the industry and its problems as well as considerable capital investment. Few companies realize the initial cost of installing a system and the organization to run it. And even fewer are aware of the numerous "hidden" costs of continuing to operate a viable in-house system.

The installation of in-house T/S is generally not a feasible alternative to the use of an external computer service organization.

What Are the Economics?

A T/S system costs between two and three times the hardware lease price if the following expenses are properly accounted for:

- Hardware and software lease and maintenance.
- Telephone and communications network.
- People.
- Facilities.
- Computer overcapacity.
- Computer usage accounting and re-

porting.

• Downtime due to hardware failures.

The real cost of implementing a viable in-house T/S system is even greater than the total of all the items listed above since the cost of certain intangibles must also be accounted for.

It is much more difficult to select an on-line system than a batch system because it is a dynamic product that must change over time to satisfy changing user

Viewpoint

needs.

If a company, however, is willing to make the systems programmer commitment to continually customize its own system, complicated technical evaluation should take place previous to procurement.

No one manufacturer has assembled a satisfactorily performing system of components for T/S, and so today's typical T/S system has components built by many vendors.

Such a system may result in a "Tower of Babel" in maintenance problems unless the concerned organization is willing to bear the responsibility for maintenance of all equipment.

Telephone communication network costs are the sleeper in the list. If all usage is to be in one city, communications costs are moderately easy to manage and ac-

count for. But if usage is spread through several cities, or across the nation, the communications problem multiplies and costs skyrocket.

Despite claims in the trade press, few T/S vendors have been successful in installing a reliable network. If a communications network is part of a company's requirement, it had better add several communications specialists to its staff and hope they are qualified.

Users must become reasonably proficient in using the system, and this requires training.

Personnel turnover, promotions and system enhancements create a further need for training, which, in turn, creates the need for expert help.

A cost for overcapacity must be shown because a company always buys too much system. A company's user load will never show up in increments of a full computer's capacity.

It has been claimed that a company has more control over services provided by its own in-house installation than it can obtain through the use of outside vendors.

The fact is that a company can get better and more controlled service from a service organization, which must perform to keep its business, than from an in-house organization which has no competition.

Crandall is president of Com-Share, Inc., a remote-computing network vendor.



For variety of reasons, IBM has dominated the EDP systems industry in a way that is almost unheard of in American business, except for publicly granted monopolies. But there are alternatives to the big boy. And that's what our March 28th Supplement is all about: *The Non-IBM World*.

Edited by Computerworld's Mike Weinstein, this study will include a look at the state of the industry, and a report on seven of IBM's competitors. Each of these companies — from Honeywell to Xerox Data Systems, has its own personality and its own place in the market. We'll be looking at their history, what they offer and where they stand. We'll also get opinions from their users, and try to create a picture of each one's strengths and weaknesses — to give

you a clear idea of where it's at.

If you're a user who wants to look past IBM's looming frame, then our March 28th Supplement is the place to start. And if you're a marketer who wants to talk to the people who run this industry, your ad should be there when *The Non-IBM World* goes out. The supplement closes on March 9th. For details, just contact the nearest Computerworld Representative: Boston, Bob Ziegel, (617) 332-5606. New York, Don Fagan (212) 594-5644. Los Angeles, Bob Byrne (213) 477-4208. San Francisco, Bill Healey (415) 362-8547. Or write to: Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160.

CI Notes

Telex-IBM Trial April 16

TULSA, Okla. — The Federal District Court here has confirmed April 16 as the date for the Telex-IBM trial despite added claims and counterclaims and requests for depositions.

At a pretrial hearing here last week, Judge A. Sherman Christensen ruled against Telex's motion to sever the IBM counterclaim relative to trade secrets from the basic trial issue.

He took under advisement the Telex charge that it had information "leading it to believe that IBM, its agents and attorneys, are engaged in a concerted effort to induce Telex's independent witnesses to refuse to testify and thus impede the progress of pretrial preparation and materially hinder the ability of Telex to present its case at the trial."

At a hearing in Minneapolis recently, Judge Philip Neville made permanent a temporary injunction prohibiting CDC and IBM from rendering "unusable any documents or other materials still in existence if they pertain to the civil antitrust suit between CDC and IBM."

He also ordered CDC and its attorneys to make available to Telex any material pertinent to the Telex case upon request and without charge, according to industry sources.

Fujitsu Orders Key-Edit Units

DON MILLS, Ont. — Fujitsu has ordered \$2.6 million worth of Key-Edit equipment from Consolidated Computer Inc. Shipment is expected to begin in June, although adaptation of the system to accept the Katakana characters has yet to be completed.

Under the agreement, Fujitsu has options for an additional \$6 million of equipment for delivery within four years.

The Japanese firm also has marketing rights to the Key-Edit equipment in Japan and selected customers in North and South America.

Supershorts

Datacraft Corp. has established a European marketing operation with headquarters in Brussels.

Cambridge Memories, Inc. has established a Canadian subsidiary to market and maintain its line of add-on and replacement computer memory systems in that country.

Interdata, Inc. has signed a two-year OEM agreement with Adage, Inc. for shipment of 61 Model 74 systems that will be incorporated into the Adage/200 graphic display system. Adage has received five Model 70 systems for use in manufacturing and program development.

'73 DP Trends Viewed

User Spending May Hit \$23.1 Billion

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK — Spending by computer users will rise 12% to a total of \$23.1 billion during 1973, International Data Corp., a computer industry research firm, told an industry briefing here last week.

In 1974, the users' budgets can be expected to increase by another 12%, the firm said, reaching \$25 billion that year. During 1973, users should spend \$13 billion for outside services, the report said, an increase of 13% over the \$11.5 billion spent in 1972.

The expenditures for internal salaries will be \$10.1 billion, it added, up 11% over the \$9.1 billion spent on salaries last year.

During 1972, IDC said, the spending by the largest 750 computer-using organizations was up less than 5% on the average although they represented 35% of the installed computer base during the year.

These users, the firm said, were very cost-conscious during the year, making them targets for the independent peripherals manufacturers and the third-party leasing companies for the savings offered by these two groups.

In fact, IDC indicated, this group of users accounted for over 65% of the business of the independents and leasing companies during the year.

Trend Toward Consolidation

In addition, the firm said there was a stepped-up trend toward centralization and consolidation on the part of these large firms during the year as a further method of keeping costs low.

In the smaller- and medium-scale computer-using organizations, which represented 65% of the computers in use at the beginning of the year, the spending increased between 10% and 15% during 1972, IDC said, due mainly to the implementation of new applications.

During the year, users new to data processing only represented 10% of the shipments in the computer industry, IDC said, and added 2% to the growth of the installed computer base. However, the firm noted, in the future new users will contribute a smaller percentage growth to the installed base of equipment.

Hardware Expenditures

Out of the total outside expenditures for firms during 1972, spending for system hardware accounted for \$7.1 billion out of the \$11.5 billion spent, IDC said. Support hardware accounted for \$795 million of the expenditures and services accounted for \$1.9 billion.

The rest was split between software (which at \$410 million was off 8% from the expenditures in 1971) and supplies which accounted for \$1.2 billion of the expenditures.

In 1973, IDC predicted spending for system hardware and for support hardware

will rise by 12%, while spending for software and services can be expected to rise by 18%. Spending for supplies will lag behind these other areas with a rise of only 10%, the firm predicted.

Present teleprocessing users will increase their expenditures by 30% next year and the year after, IDC said, outstripping the growth of the more traditional users. In addition, many new teleprocessing users can be expected to emerge in the next two years, the firm said.

In general, IDC indicated, user expenditures will continue on about the same ratio as in 1972: 44% on salaries; 35% on systems; 6% on supplies; 4% on support hardware; 2% on software and 9% in the services area, although there will be some small rises and decreases over the 1973-74 period.

In all, users are expected to increase their expenditures for outside services by 13% during 1973.

During 1974, however, the spending should rise 12% in total, with system hardware showing an 11% increase; support hardware up 12%; services up 17%;

software showing a 15% jump; and supplies rising by only 9% during the year.

In the area of software, the firm predicted packages could be expected to grow at a rate of 25% to 30% yearly, while the growth in custom work would slow down somewhat.

Teleprocessing Spurs Growth

The major single factor contributing to the growth of user budgets over the next few years, IDC said, is the growth in teleprocessing systems, which will cause a need for communications-oriented mainframes and disk drives for on-line data bases as well as terminals, front ends and intelligent terminals.

In the services area, this will mean more user spending for remote services and for education courses to enable users to take advantage of the new systems.

In the software field, the growth of teleprocessing will cause a growth in the need for sophisticated software talent and for data communications-oriented program products.

Adapso Group Wants to Split IBM Software, Hardware Efforts

By a CW Staff Writer

NEW YORK — IBM's software operations should be completely separate from its hardware operations, the Software Industry Association of the Association of Data Processing Service Organizations (Adapso) told the Justice Department recently.

In a position paper on "IBM's monopolization of the Software Products and Services Industry," the Adapso group asked the Justice Department, in its antitrust action against IBM, to seek to prohibit IBM from directly or indirectly tying its hardware and software marketing efforts.

"To that end, IBM must be required to separate its software development and marketing so as to be separate and independent from its hardware operations," the group said.

Monopoly Alleged

The group charged that "IBM is currently, and has been since before the announcement of System/360, monopolizing in the area of software product development for IBM computers."

"This monopolization, which has resulted in the inefficient use of IBM hardware by the government and by commercial users, is a major contributor to high cost and poor utilization of computers," the Software Industry Association added.

The organization charged that IBM had no incentive to make efficient software

tools available to users, since efficient software might slow down the sales of mainframes.

At the same time, the organizations said the classical antitrust relief of dividing IBM into several computer hardware companies — as sought by the Justice Department — "will not be to the short- or long-term benefits of the public, of other users of computers or of the software products industry."

"This proposed vertical restructuring of IBM could result in incompatibility between IBM hardware and software and also in increased costs in the overall development of software products," the organization charged.

Special Controls

At the same time, however, the group recommended that special controls be placed over the new software organization if its plan were adopted, since that organization would be able to control that market.

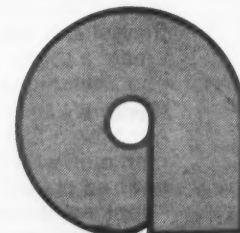
To do this, the Adapso group said "all IBM software, both existing and planned, must be priced on a basis which yields a return and reflects all associated costs, separate and apart from its hardware."

In addition, "safeguards must be implemented to insure that a competitive software industry, once established, will remain outside the domain of IBM," the group said.

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COMPUTERWORLD

For a variety of reasons, IBM has dominated the EDP systems industry in a way that is almost unheard of in American business, except for publicly granted monopolies. But there are alternatives to the big boy. And that's what our March 28th Supplement is all about: *The Non-IBM World*.

Edited by *Computerworld's* Mike Weinstein, this study will include a look at the state of the industry, and a report on seven of IBM's competitors. Each of these companies—from Honeywell to Xerox Data Systems, has its own personality and its own place in the market. We'll be looking at their history, what they offer and where they stand. We'll also get opinions from their users, and try to create a picture of each one's strengths and weaknesses—to give you a clear idea of where it's at.

If you're a user who wants to look past IBM's looming frame, then our March 28th Supplement is the place to start. And if you're a marketer who wants to talk to the people who run this industry, your ad should be there when *The Non-IBM World* goes out. The supplement closes on March 9th. For details, just contact the nearest *Computerworld* Representative: *Boston*, Bob Ziegel, (617) 332-5606. *New York*, Don Fagan (212) 594-5644. *Los Angeles*, Bob Byrne (213) 477-4208. *San Francisco*, Bill Healey (415) 362-8547. Or write to: Judy Milford, *Computerworld*, 797 Washington Street, Newton, Mass. 02160



COMPUTERWORLD

GSA Sees Memory Awards Saving Over \$17 Million

WASHINGTON, D.C. — The General Services Administration (GSA) has exerted its buying power in the award of two large contracts to memory makers, and anticipates the contracts will result in cost reductions to the government of more than \$17 million.

The awards, to Ampex Corp. and Cambridge Memories, Inc., cover new or replacement memory units for the 360/30, 40, 50 and 65 and the Univac 1106 and 1108. The contracts are for one year with a renewal option for another two years.

Under these requirement-type contracts, all federal agencies within the continental U.S. must use these contracts when acquiring new or replacement memory units for the above configurations, according to the

GSA.

GSA intends to use the requirements-type contract, although a relatively new procedure for the contracting of computer equipment, more frequently, according to Ted Trimmer, commissioner of GSA's Automated Data and Telecommunications Service.

Prices under the Ampex contract reflect cost reductions of 76% to 88% in relation to the list price of original equipment manufacturers, GSA said. Under the Cambridge Memories contract the GSA has gained a cost reduction of 73%, a department spokesman said.

An additional award that will include memory replacements for certain models of the IBM 370 series will be made soon, he added.

Dean Witter Orders Bunker Ramo Communications, Quotation System

TRUMBULL, Conn. — Dean Witter & Co., a brokerage firm, has contracted with Bunker Ramo for a data communications and quotations system to connect 76 branch offices to a central computer for routing, processing and recording of all buy and sell orders for stocks and commodities. The multi-million dollar system will include 1,300 terminals, 100 printers and a communications control processor.

Other Contracts

Computer Sciences Corp. has received a contract from the Defense Communications Agency to develop software for research and development of the intercomputer network that will support the World Wide Military Command and Control System.

Computing & Software has been awarded a \$1.8 million contract by the California Department of Human Resources Development to supply data processing services for the Los Angeles County Job Bank.

Univac has been selected to

supply DP equipment for the Air Force Human Resources Laboratory, Lackland Air Force Base. The equipment will replace an IBM 7040 computer.

Systems Engineering Laboratories will supply Combustion Engineering Inc. with computer

Contracts

systems to monitor and supervise operations of its nuclear power plant stations.

Consolidated Computer Inc. of Canada has signed a contract with International Computers Ltd. for \$1.5 million worth of ICL Key Edit entry systems.

Telefile Computer Products Inc. has received a subcontract from ITT Defense Communications for two DC-18 Disk File Controllers, eight DD-215 Dual Density Disk Storage Units and a specially designed dual-access switching unit. The equipment will be used by ITT for a communications system for the State Department.

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5561

Experimental Memories Unveiled

RCA Uses Holographic Approach, IBM Puts 8K on Chip

By a CW Staff Writer

PHILADELPHIA — Two experimental memory systems have been unveiled, with IBM showing an 8K memory on a single-chip and RCA announcing a "breakthrough" that could bring the application of lasers and holographic memories a step closer.

The new unit, described by IBM engineers at the International Solid-State Circuits Conference of the IEEE, is basically an upgrading of the present technology which currently sees 2K and 4K as the maximum chip sizes.

The RCA development, however, appears to be one of the first practical applications of the holographic principles that have been long touted as the memory technique of the future.

The IBM 8K fully functional random access memory on a chip was fabricated using a p-channel, self-aligned poly-silicon gate process. It measures 145 by 201 mils and is organized 128 words by 64 bits,

the engineers said.

In order to achieve the bit density which equals 280,000 bit/sq in., the IBM researchers used a one-device dynamic cell configuration that was developed in the Yorktown, N.Y., facility.

A two-level memory hierarchy system, called a one-slot paging store, is built into the chip to maximize bit transfer speed. With each access, 64 data bits are transferred from the main array into a high-speed buffer in the center of the chip.

The buffer is then randomly interrogated a single bit at a time. This results in an initial access of approximately 2 μ sec and subsequent buffer access of about .5 μ sec, the IBM engineers said.

The field effect transistor (FET) chip contains all the support circuitry needed to operate it, including data registers, address inverters, decoders, word line biasing, phase drivers, input biasing and chip select.

The unit was designed at IBM's System Products Division Laboratory in Essex Junction, Vt., and was described by William K. Hoffman and Howard L. Kalter.

Buck Rogers?

The Buck Rogers-like invention from RCA employs a laser, liquid crystals, electro-acoustic deflectors and holograms stored on thermoplastics and can perform the full-cycle data processing operations of write, store, read and erase.

The new memory system could store as much data as large disk systems currently in existence, but would be 1,000 times faster, RCA said, indicating the new devices could bridge the gap between large-scale auxiliary storage and main computer memory.

Simplify Architecture?

"The holographic memory has the potential, when fully developed, to replace the entire hierarchy of core, drum and disk systems now used, and thereby to simplify the whole architecture of computers and many other information systems," according to Thomas O. Stanley, staff vice-president of research programs for the firm.

The memory stores data in holograms formed by a laser beam on a thermoplastic storage medium. Enroute to the storage medium, the beam strikes liquid crystal cells, which can be controlled electronically to scatter light or be transparent.

These cells introduce digital information into the laser beam in the form of tiny areas that are dark (where the cells are scattering) and light (where they are transparent). This pattern of darkness and light, recorded in the hologram, corresponds to the zeros and ones of binary

code.

Once the data is stored in the hologram, it can be read by passing the laser beam through the hologram. The beam projects the holographic information onto a light-sensitive array which converts the optical data into electronic signals.

To erase the hologram, heat is applied to the thermoplastic storage medium, which then permits another hologram to be written in its place.

The unit was developed under partial support from Nasa's Marshall Space Flight Center.

Swedish DP Industry Urged to Specialize

STOCKHOLM — The Swedish DP industry should concentrate on equipment for special applications such as paper, steel, engineering industries, hospitals and banks, areas in which Sweden has received recognition for advanced technology, according to a recent government-sponsored study.

The total annual market for computer equipment, both hardware and software, components and services, is estimated at about \$208 million, with a growth rate of 10% to 20% per year, the study noted.

The total value of installed and ordered computer equipment in Sweden in 1972 amounted to about \$520 million, the report continued.

The report recommended that the position of the computer user be strengthened, possibly through the establishment of a consumer-oriented "center for computer development." It also suggested that DP training could be made a compulsory subject in schools.

Burroughs Names Two to Board

DETROIT — Burroughs Corp. has expanded the size of its board to 12 directors with the election of Clifton R. Wharton Jr. and Charles E. Exley Jr. to the newly created positions.

Wharton, president of Michigan State University, becomes Burroughs' first black director. An economist, Wharton has served as a member of advisory panels on East Asian and Pacific Affairs of the U.S. Department of State, as well as on the U.S. panel of the United Nations Association devoted to world population and the quality of human development.

Exley has been vice-president, finance, since January 1971. He joined Burroughs in 1954 and became controller in 1963. In 1966, he became vice-president and group executive of the Business Forms and Supplies Group.

IBM Names Scranton

ARMONK, N.Y. — William W. Scranton,

former governor of Pennsylvania, has been elected to the board of directors of IBM. He was a director of IBM's World Trade Corp. for four years until October 1971, when he became a member of the President's Price Commission.

Other Moves

■ Robert L. Horowitz has been named president of GRI Computer Corp. He has been chairman of the board of directors since GRI's inception in 1967 and will continue to serve in that capacity.

■ Intel Corp. has appointed R. Douglas Norby, vice-president, finance, president

Executive Corner

of a newly created subsidiary, Intel Lease Funds, Inc., which will act as a development arm of Intel.

■ Charles E. Byrne, formerly president of Logos Development Corp., has been appointed vice-chairman of the board. Bernard E. Scott, formerly a vice-president of Logos, replaces Byrne as president.

■ Norman P. Gruczelak is the new president of Bright Industries, a Sunnyvale, Calif., based firm.

■ Gary L. Neale has been elected president in charge of all domestic and foreign operations for On-Line Decisions, Inc. He was formerly vice-president in charge of domestic operations, including marketing and all consulting activities.

■ H. Glen Haney, previously director of marketing, has been named vice-president of marketing in the Americas Division of Sperry Univac.

■ Keydata Corp. has announced the appointment of Randolph S. Naylor as vice-president, marketing. Naylor was previously eastern area manager for the Service Bureau Corp.

■ George O. Harmon has joined NCR as vice-president, technical services. He was formerly director of management systems in the Field Engineering Division of IBM's Data Processing Group.

■ James E. Heaton has been appointed a vice-president for Ann Arbor Computer Corp., a subsidiary of Jervis B. Webb Co.

■ Jim Williamson has been named vice-president, manufacturing, of Telex Computer Products, Inc.

■ Edward F. Kearns has been named vice-president, marketing, for the Sperry Univac Communications & Terminals Division. Kearns is the former president of Courier Terminal Systems Inc.

The 1973 Computer Caravan is coming

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March 13-15 — Regency-Hyatt House

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March 20-22 — Hyatt-Regency Houston

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March 27-29 — Disneyland Hotel

SAN FRANCISCO

April 3-5 — Civic Auditorium

KANSAS CITY, Mo.

April 11-13 — Municipal Auditorium

CHICAGO

April 17-19 — Conrad Hilton Hotel

CLEVELAND

April 24-26 — Convention Center

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2:30 p.m. Data Communication Planning

Day 2:

9:00 a.m. Data Communications
2:30 p.m. Software Evaluation Panel

Day 3:

9:00 a.m. Installation Management
2:30 p.m. Small Systems Panel

*Entry to the morning sessions is \$25 per day, which includes all workshop materials, luncheon, and admission to the Exposition Hall (see pre-registration form on page). Afternoon sessions are open to all — free of charge.

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Offshore Key punching Breaks Bottlenecks

Special to Computerworld
KINGSTON, Jamaica—Several service bureaus have responded to users' need to break the input bottleneck without breaking their budgets by turning to the "punch and pack" business, or offshore keypunching.

The offshore approach has become increasingly popular, particularly with organizations faced with massive file conversions or huge supplies of source documents that require punching on a regular basis.

Ten years ago the idea of having valuable input documents flown 4,000 miles for keypunching would have been considered absurd.

But today source documents are whizzing all over the world—Mexico City, Hong Kong, Ireland and Kingston, Jamaica, are just a few of the places with successful offshore installations.

Jamaica was one of the first countries to recognize the potential of data processing as an export industry more than nine years ago.

DP is a clean, non-polluting industry that's well-suited to the country's educated and fast-growing white collar labor force.

Location in Jamaica has a number of advantages for the five U.S. service bureaus here.

It is only a three and one-half hour flight from New York, it's an English-speaking nation and, most important, it's profitable. The Jamaican keypuncher is paid a good local salary of about \$35 a week, roughly a third of what her U.S. counterpart makes.

Salaries are the largest single expense of input preparation. That's why Jamaica and the other countries involved in preparing input offshore have been successful building up their DP industries.

None of the companies involved in the offshore data input business is willing to give an exact breakdown of figures, but it's apparent the payroll savings alone more than offset all of the other considerations.

John Ciarmella, president of

Datatron Processing Inc., a New York-based company that specializes in subscription fulfillment listings, direct mail and book fulfillment, estimates the cost of processing source documents in Kingston is roughly 70% less in Jamaica than it is in the U.S.

The firm employs some 120 typists who prepare optically scannable input for the company's computers in Flushing, N.Y.

Questionable Image

Traditionally, one of the biggest objections to offshore service bureaus has been the "punch and pack" image. Eyebrows have also been raised about the turnaround time involved in going offshore and the security of the documents once they leave the client's premises.

However, it doesn't take a great deal more time to have keypunching done across the water, than it does across town.

Security isn't a big problem either because the keypunchers rarely work with original documents.

An offshore operation does not have to mean "just punch and pack." Most offshore operations can document excellent production records.

An example is Data Key Ltd., an Akron, Ohio, firm that can document an error rate of .004%. The company sells quality rather than price. It charges



Data Key Ltd.'s keypunch room guarantees an error rate of .004%.

the same rates to its customers that it would if the punching were being done in the U.S., but it uses 100% verification to keep its error rate down and employs several full-time people to continuously sample the work.

Data Key has a contract with one customer that guarantees the repunching of an entire batch of 5,000 records if there are three errors in every 78,000 characters punched. The company has never had to repunch, according to President Arthur Williams.

"Most of our customers either microfilm or photocopy their source documents, so the girls don't have to handle the originals," Williams said.

"There's no question that control is a serious consideration for anyone thinking about the offshore approach. We take every possible security precaution," he added.

So do the other firms involved in long-distance keypunching. None of the five companies currently operating in Jamaica has

reported losing a shipment. However, all of them insure their source documents for a considerable sum just to be sure.

Cultural Differences

"I think that anyone planning an offshore keypunching operation should be as cognizant as possible of cultural differences," said Louis O. Colburn, executive vice-president of Fimaco, Inc., a Philadelphia subscription fulfillment firm.

"For example, we had to familiarize our girls with Zip Codes and the standard abbreviations for U.S. cities and states. They were familiar with British spellings and abbreviations. It's not a big thing, and they picked it up quickly. But it is the kind of thing you'll run into in an offshore operation."

Turnaround is not as big a problem as one would at first suspect. The average turnaround time reported by all the companies is less than a week. Rush jobs can be turned around even faster.

Financial World Moves to Expand DP Use

NEW YORK—Various segments of the investment community are moving to increase the use and capabilities of automatic quotation and recordkeeping systems, in efforts to expedite processes and reduce paperwork.

The concept of a composite ticker tape, which would carry trades made on and off the Big Board, has been a cornerstone in the reforms being advocated by the Securities and Exchange

Commission.

Securities industry leaders have agreed to set up a Composite Tape Association that would create two tapes, since one tape recording trades from both the New York Stock Exchange and the American Stock Exchange and all regional exchanges would move so fast as to be illegible.

One tape would display all transactions in securities listed on the Big Board, regardless of where the trade occurred, and the second tape would report trades in Amex listed stocks, as well as stocks traded only on regional exchanges.

A proposal submitted by industry leaders to the Securities and Exchange Commission provides for a 20-week test in which reports on 15 NYSE-listed issues would be fed onto the Big Board tape from regional exchanges.

At least one "third market" dealer would report his over-the-counter transactions in those issues, thus giving representation to all factors trading in these particular stocks.

The National Association of Securities Dealers (NASD) has made overtures to Bunker Ramo Corp., operator of the automatic price quotation system for over-the-counter stocks (Nasdaq), for the purchase of the system.

The NASD has indicated it would like to see the system enhanced, to include automatic execution of buying and selling shares, and to display the number of shares brokers are willing to buy or sell. The group also is looking at Nasdaq with increasing interest for financial reasons.

Although the system has not been profitable to Bunker Ramo, since price increases were held up until recently by the

Wage and Price Board, the system can be expanded and enhanced.

In the area of communications, the Securities Telecommunications Organization (STO), a network to expedite handling of investors' orders and broker communications, is expanding its services to all regional exchanges and their members.

Until recently, the New York and American exchanges had been the sole users of the capabilities offered by STO, a subsidiary of the two exchanges.

The idea of a central depository for certificates, and a corresponding reduction in paperwork, is catching on.

The New York Stock Exchange's Central Certificate Service, Inc., a depository for securities certificates and a computerized system for settlements of securities transactions among participating brokers and financial institutions, has established three out-of-town locations.

Hartford, Conn., Richmond, Va., and Dallas are the new sites that enable participating brokerage houses to deposit their securities in a local bank.

Under the depository system, the change of ownership paperwork is done by computer once the securities are deposited.

During 1972, \$170 billion in computerized depository deliveries were reported made through the system, a 70% increase over the previous year. CCS officials estimate the system has eliminated handling of almost two million pieces of paper each month in addition to reducing the movement of stock certificates.

Earnings Reports

GENERAL INSTRUMENT

Three Months Ended Nov. 26

	1972	1971
Shr Ernd	\$.38	\$.23
Revenue	82,955,876	72,653,400
Spec Cred	.....	250,000
Earnings	2,900,506	1,937,950
9 Mo Shr	.88	.50
Revenue	228,554,363	205,633,132
Spec Cred	.....	250,000
Earnings	6,990,807	4,499,274

a-Adjusted for a 2% stock dividend in May 1972.

COMPUTEST

Three Months Ended Nov. 30

	1972	1971
Revenue	\$1,161,624	\$984,809
Spec Cred	\$58,102	.....
Loss	142,485	258,912
6 Mo Rev	2,155,894	2,167,518
Spec Cred	\$58,102	.....
Loss	299,330	381,022

a-From sale of land.

DPF

Six Months Ended Nov. 30

	1972	a1971
Shr Ernd	\$.04	.....
Revenue	17,428,000	\$22,605,000
Spec Cred	\$150,000	.....
Earnings	150,000 (34,444,000)	.....

a-Restated to reflect year-end retroactive adjustments. b-From repurchase of debentures.

SPERRY RAND

Three Months Ended Dec. 31

	1972	a1971
Shr Ernd	(.000)	(.000)
Revenue	\$.68	\$.48
Revenue	565,353	453,935
Earnings	23,409	16,364
9 Mo Shr	1.77	1.19
Revenue	1,594,238	1,274,146
Earnings	60,825	40,733

a-Restated.

TEXAS INSTRUMENTS

Year Ended Dec. 31

	1972	1971
Shr Ernd	\$4.34	\$3.05
Revenue	943,694,000	764,258,000
Earnings	48,030,000	33,723,000

MSI DATA

Three Months Ended Dec. 23

	1972	a1971
bShr Ernd	\$.09	\$.04
Revenue	3,600,004	2,516,053
Earnings	165,983	55,994
b9 Mo Shr	.21	.21
Revenue	9,773,861	7,593,647
Tax Cred	.....	92,000
Earnings	375,593	330,444

a-Restated for inventory adjustments and computation of income taxes principally applicable to foreign operations. b-Adjusted for three-for-two stock split in May 1972.

VERMONT RESEARCH

Year Ended Sept. 30

	1972	1971
Shr Ernd	\$1.36	.....
Revenue	5,744,059	\$5,050,696
Tax Cred	114,000	25,000
Earnings	904,250	(678,323)

COM-SHARE

Three Months Ended Dec. 31

	1972	1971
Shr Ernd	\$.12	\$.08
Revenue	2,169,947	1,718,363
Spec Cred	\$22,118	\$33,626
Earnings	146,785	88,408
6 Mo Shr	.22	.....
Revenue	4,038,768	3,209,485
Spec Item	\$84,118	\$19,374
Earnings	270,258	(15,880)

a-Credit; consists of a tax credit less loss from disposition and writedown of investment. b-Consists of tax credit less loss from abandonment of computer center. c-Charge; consists of loss from income tax reduction from carryforward of prior year's losses and loss from abandonment of computer center.

DECISION DATA COMPUTER

Year Ended Nov. 30

	1972	1971
Revenue	\$3,395,723	\$181,432
Loss	2,522,993	1,908,776

CENTRONICS DATA COMPUTER

Three Months Ended Dec. 31

	1972	1971
Shr Ernd	\$.23	\$.07
Revenue	5,479,000	1,472,000
Tax Cred	.....	153,060
Earnings	1,107,000	317,000
6 Mo Shr	.36	.10
Revenue	9,039,000	2,423,000
Tax Cred	.....	227,180
Earnings	1,774,000	484,960

DATA-CONTROL SYSTEMS

Three Months Ended Dec. 29

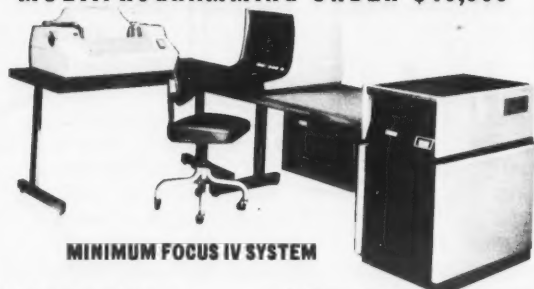
	1972	1971
Shr Ernd	\$.06	\$.05
Revenue	1,308,000	1,529,000
Tax Cred	18,000	15,000
Earnings	51,000	44,000

COMPUGRAPHIC

Three Months Ended Dec. 31

	1972	1971
Shr Ernd	\$.39	\$.13
Revenue	10,128,000	5,560,000
Earnings	710,000	224,000

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SYDNEY, Australia — Computer industry growth in Australia has not progressed because of a lack of trained experts in the field, said Dr. J.L. Byrne, head of the mathematics department of Queensland Institute of Technology.

Byrne is outlining a new course in computer operation beginning at the institute next year.

"There is a shortage everywhere of people trained to use computers," he said. "Employees of computer firms are inclined to leave after 18 months, just as they are becoming productive."

"With more qualified workers

in the community, they would not be able to change their jobs so frequently."

Byrne said this rapid turnover of staff is a cause of concern.

Minis to Control Link Between U.S., Soviets

FT. LAUDERDALE, Fla. — Two DC 6024/5 computers made by Datacraft Corp. have been selected for use in a direct space communications link between the U.S. and the Soviet Union.

The computers will be located at a new earth station near Washington, D.C., and will control two reflector assemblies.

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The University of Idaho is accepting applications for the position of Director of Computer Services. Computer Services will process all academic and administrative computing. A candidate with strong managerial ability is being sought. Suitable applicants will be considered for a joint faculty appointment in their academic discipline. Salary will be dependent on qualifications. Interested persons should send a resume to:

The Office of the President
University of Idaho
Moscow, Idaho 83843.

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DIRECTOR OF DATA PROCESSING

Overall responsibility for all data processing operations and the expansion of the educational use of the computer. Should have knowledge of both systems design and programming. Many financial and educational applications are currently operating on a twenty-four hour, five day week operation. Applicants should have a minimum of three years administrative/supervisory experience. Salary, \$15,000-\$20,000. Send resume to:

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School City of Gary
620 East 10th Place
Gary, Indiana 46402

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Dr. Jack M. Ryder
Vice Chancellor and Dean for Administrative Affairs
IUPUI, 1201 E. 38th Street
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Continued growth in soft-wired N/C systems and expansion into computer monitoring and control systems has created openings for several software development engineers. Candidates should be degreed in EE or Computer Science with experience in assembly language programming, preferably on minicomputers. Industrial or process control background very desirable, especially in real-time systems design.

Interested candidates are invited to send a resume indicating salary requirements in confidence to:

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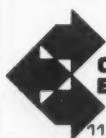
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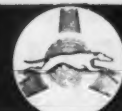


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CMC Breaks Into the Black

SANTA MONICA, Calif. — Computer Machinery Corp. attained its first profitable quarter, which has helped reduce losses for the year.

Earnings for the quarter ended Dec. 31 totaled \$373,000 or 8 cents a share, including a \$61,000 special credit on revenues of \$10.3 million. This compares with a loss of \$3.7 million or 78 cents a share in the same period last year, when revenues totaled \$1.9 million.

"Past losses resulted from building a CMC-owned lease base which accrues recurring revenues to the company," explained President Thomas L. Ringer.

"We are confident that 1973 will be a profitable year and expect to ship systems with a sales value exceeding \$65 million," he said.

For the year, CMC showed a loss of almost \$2 million or 40 cents a share, including a \$168,000 special credit, compared with a loss in 1971 of \$6.8 million or \$1.65 a share.

Revenues in 1972 totaled \$29.6 million, a three-fold increase over 1971 revenues of \$8.9 million.

Deliveries at sales list price totaled \$47 million in 1972, up from \$27 million in 1971. Backlog at the end of 1972 stood at about \$20 million, compared with \$16 million in 1971, the firm said.

Computer Sciences Takes Writeoff

LOS ANGELES — Computer Sciences Corp. (CSC) announced losses for the third quarter and nine months ended Dec. 29. And the firm declared it would write off \$2.3 million in the fourth period, as a result of the termination of CSC's contract with the New York City Off-Track Betting Corp.

The \$2.3 million covers the total writeoff of receivables which were previously anticipated to be recovered from monthly transaction charges for use of the system through June

30, 1974.

In the third quarter, revenues rose to \$35.6 million from \$30.6 million, but the loss totaled \$277,000 or 2 cents a share compared with earnings of \$1.2 million or 9 cents a share in the year-ago period.

The nine month loss totaled \$2.1 million or 15 cents a share, in contrast with earnings of \$3.5 million or 26 cents a share in the same 1971 period. Revenues rose to \$101.4 million from \$96.5 million.

Record Half

Computer Automation Earnings Top '72's

IRVINE, Calif. — Computer Automation, Inc. has completed a record first half, with earnings 25% above those for all of fiscal 1972.

The burgeoning OEM market for the Naked mini machines was in large part responsible for the sharp rate of growth in sales, according to President David H. Methvin.

Revenues almost tripled to \$4.8 million from \$1.7 million in the year-ago period ended Jan. 2, 1972.

Earnings, meanwhile, rose to \$577,907 or 38 cents a share from \$153,443 or 13 cents a share in the same period last year. Both periods included special credits, of \$183,000 in 1972 compared with \$73,000 last year.

In the quarter, sales totaled

\$2.7 million compared with \$940,352, while earnings doubled to \$237,736 or 15 cents a share compared with \$106,436 or 9 cents a share.

Methvin said he is pleased with the growth rate in sales and that he expects the company to continue to grow, although "not at this extraordinary rate" over the long term.

"This kind of performance is indicative of the leverage which is characteristic of our kind of business — the dedicated OEM business," he explained, "where we sell large numbers of computers to many companies which supply products and systems to dozens of applications areas that we would never attempt to reach."

Odec, Centronics Show Increase In Revenues in Half-Year Period

Two printer manufacturers — Odec, Inc. and Centronics Data Computer Corp. — have reported increased sales in the six months ended Dec. 31.

Odec's revenues totaled a record \$2.4 million, a jump of

146% from the same period last year.

Earnings, however, declined after writing off deferred product development costs. Earnings sank to \$43,000 from \$55,000 in the same period last year. Also, there was a \$14,000 special credit in the current period, compared with a \$20,000 credit in the year-ago period.

At Centronics, a strong second quarter helped lift six month revenues to \$9 million compared with \$2.4 million a year ago. Earnings for the six months totaled \$1.8 million or 36 cents a share compared with \$484,960 or 10 cents a share.

In the second quarter sales reached \$5.5 million, a 54% increase over the first quarter, with earnings climbing to \$1.1 million or 23 cents a share compared with \$317,000 or 7 cents a share in the same 1971 quarter.

C&S Looks to 15% Rise in Earnings

LOS ANGELES — Computing & Software Inc. "sees no reason it can't achieve a 15% increase in earnings and sales" in the current fiscal year, according to President Norman Friedmann.

The firm had record revenues of \$110.9 million for 1972 compared with almost \$95 million in the year-ago period. Earnings climbed to \$7.5 million or \$1.25 a share compared with almost \$6

million or 96 cents a share in the same year-ago period.

During the year C&S divested itself of three service businesses. Per share losses from these and prior discontinued operations were 5 cents compared with 2 cents a year ago.

"The record 1972 financial results reflect successful expansion and increased penetration of our basic business services markets. We anticipate further increases in sales and earnings next year based on the current rate of internal growth," according to Friedmann.

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50.00	Sub-sieve sizer calibrator	46,000.00	For 1 grant to carry out epidemiological studies of cancer in various sites
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Pertec Explains Earnings Decline

LOS ANGELES — Pertec Corp. cited proxy contest costs and increased engineering, marketing and production start-up costs as factors contributing to the lower earnings in the second quarter and six months ended Dec. 29.

The proxy fight showed as an \$80,000 charge on the books.

Revenues remained relatively constant in the second quarter — almost \$6 million compared with \$6.1 million in the year ago period — but earnings declined to \$193,000 or 6 cents a share compared with \$647,000 or 21 cents a share in the same period a year ago.

In the six months, revenues rose slightly to \$11.9 million from \$11.7 million, while earnings fell to \$647,000 or 21 cents a share from \$1.2 million or 38 cents a share in the year ago period.

The second quarter of 1971 was the last period in which revenues were affected by accelerated shipments of key-to-tape systems to the Singer Co., according to Frank Grisanti, chief executive officer. Shipments to Singer have remained

at a relatively constant level since then, he added.

Graham Quarter Sales Set Record

GRAHAM, Texas — With record sales for the quarter, Graham Magnetics Inc.'s second quarter and six months showed improved revenues and earnings.

In the quarter, earnings reached \$327,973 compared with \$204,274 in the year-ago period. Revenues topped \$3 million, compared with \$2.3 million in the same 1971 period.

Six month earnings totaled \$548,376 or 60 cents a share compared with \$488,481 or 67 cents a share. Results for the 1971 period included a \$186,400 tax loss carryforward.

Graham is developing specialized magnetic tapes for use in severe environments of temperature and humidity, revealed President George A. Jagers.

The company has also developed a miniature tape certifier, which will be available in April, he said.

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	1972-73 RANGE (1)	CLOSE FEB 22 1973	WEEK NET CHNGE	WEEK PCT CHNGE
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A APPLIED DATA RES.	3- 7	3 5/8	+ 1/2	+16.0
O APPLIED LOGIC	1- 4	2 3/4	- 1/8	-4.3
N AUTOMATIC DATA PROC	0- 99	76 1/2	- 1/4	-0.3
O BRANDON APPLIED SYST	1- 2	5/8	0	0.0
O COMPUTER DIMENSIONS	4- 14	3 1/2	0	0.0
O COMPUTER DYNAMICS	1- 4	7/8	0	0.0
O COMPUTER NETWORK	2- 7	2 1/4	- 1/4	-10.0
N COMPUTER SCIENCES	0- 10	4 1/4	0	0.0
O COMPUTER TASK GROUP	1- 2	1 1/2	0	0.0
O COMPUTER TECHNOLOGY	2- 8	2 3/8	0	0.0
O COMPUTER USAGE	7- 14	7 1/4	- 1/4	-3.3
N COMPUTING & SOFTWARE	0- 28	10 1/2	- 1/8	-1.1
O COMRESS	1- 3	7/8	0	0.0
O COMSHARE	0- 10	7 1/2	- 1/8	-1.6
O DATATAB	4- 9	3 1/2	- 1/8	-3.4
O EDP RESOURCES	2- 8	1 1/2	- 1/4	-14.2
A ELECT COMP PROG	0- 5	1 3/8	- 1/8	-8.3
N ELECTRONIC DATA SYS.	43- 65	49 7/8	+ 3/8	+2.9
O INFORMATICS	0- 11	3 5/8	- 1/4	-6.4
O I.O.A. DATA CORP	1- 3	3/4	+ 1/4	+50.0
O KEANE ASSOCIATES	4- 7	3 3/4	0	0.0
O KEYDATA CORP	7- 13	9 1/2	- 1/8	-1.2
O LOGICON	4- 9	6 1/4	+ 1	+19.0
A MANAGEMENT DATA	3- 10	3 1/4	0	0.0
O NATIONAL CSS INC	0- 37	35 5/8	- 1/8	-0.3
O NATIONAL INFO SRVCS	1- 5	1 3/4	0	0.0
P ON LINE SYSTEMS INC	8- 28	22 3/4	- 1/4	-1.0
N PLANNING RESEARCH	4- 17	4 1/4	- 1/2	-10.5
O PROGRAMMING METHODS	20- 25	22 1/2	0	0.0
O PROGRAMMING & SYS	1- 2	7/8	- 1/8	-12.5
O RAPIDATA INC	5- 27	21 1/4	0	0.0
O SCIENTIFIC COMPUTERS	0- 4	1 3/8	- 1/8	-8.3
O SIMPLICITY COMPUTER	1- 5	3	+ 1/8	+4.3
O TBS COMPUTER CENTERS	3- 6	3 1/4	0	0.0
O TCC INC	1- 3	1/2	0	0.0
O TYMSHARE INC	0- 12	7 7/8	- 1 1/4	-13.6
O UNITED DATA CENTER	5- 8	5 1/2	+ 1/4	+4.7
N UNIVERSITY COMPUTING	7- 26	11 3/8	+ 2 7/8	+33.8
A URS SYSTEMS	0- 10	5 7/8	- 1/8	-2.0

PERIPHERALS & SUBSYSTEMS

N ADDRESSOGRAPH-HULT	23- 49	22 5/8	- 1 7/8	-7.6
O ADVANCED MEMORY SYS	0- 23	18 3/8	+ 1	+5.7
N AMPEX CORP	5- 15	6 1/2	+ 1/2	+8.3
O ANDERSON JACOBSON	4- 8	5 7/8	+ 3/8	+6.2
O BEEHIVE MEDICAL ELEC	1- 8	6 1/8	+ 1/8	+2.0
A BOLT, BERANEK & NEW	0- 21	9	0	0.0
N BUNKER-RAND	8- 14	7 3/4	- 1/2	-6.0
A CALCOMP	0- 25	12	- 1/4	-2.0
O CAMBRIDGE MEMORIES	9- 15	10 1/2	- 5/8	-5.6
O CENTRONICS DATA COMP	6- 28	19 1/4	- 4 1/2	-18.0
O CODEX CORP	0- 25	14 1/4	- 1 3/4	-10.9
O COGNITRONICS	2- 5	1 5/8	0	0.0
O COMPUTER COMMUN.	0- 7	2 3/4	0	0.0
A COMPUTER EQUIPMENT	2- 4	2 1/4	0	0.0
O COMPUTER MACHINERY	0- 13	11	- 1/8	-1.1
O COMPUTER TRANSCIVER	2- 9	3 1/2	0	0.0
A COMPUTEST	3- 9	4 1/2	+ 1	+28.5
N CONRAC CORP	0- 39	23 3/4	- 3/4	-3.0
A DATA PRODUCTS CORP	3- 7	3 3/4	- 1/8	-3.2
O DATA RECOGNITION	1- 5	2 1/2	0	0.0
O DATA TECHNOLOGY	0- 5	3 7/8	- 1/4	-6.0
O DI/AN CONTROLS	0- 8	3 3/4	- 1/8	-3.2
N ELECTRONIC M & M	0- 8	4 1/2	- 1/4	-5.7
O FABRI-TEK	2- 5	3 7/8	+ 1/4	+6.8
O GENERAL COMPUTER SYS	6- 16	8 1/2	+ 1/4	+3.0
N GENERAL ELECTRIC	0- 74	67 7/8	- 2	-2.8
N HAZELTINE CORP	7- 13	7 1/4	- 1/8	-1.6
O INFOREX INC	14- 36	14 1/8	+ 1/4	+1.8

SUPPLIES & ACCESSORIES

O INFORMATION DISPLAYS	1- 5	3/4	- 1/8	-14.2
O INFORMATION INTL INC	0- 25	12 1/4	- 1 1/4	-9.2
A LUNDY ELECTRONICS	6- 14	6 5/8	+ 1/8	+1.9
O MANAGEMENT ASSIST	1- 1	1/2	0	0.0
A MILGO ELECTRONICS	0- 44	22 1/4	- 3/4	-3.2
N MOHAMK DATA SCI	8- 27	8 5/8	- 3/8	-4.1
O ODEC COMPUTER SYST.	3- 12	3 1/4	- 1/4	-7.1
O OPTICAL SCANNING	0- 16	3 1/4	- 1/4	-7.1
O PERTEC CORP	6- 17	6 7/8	+ 1/8	+1.8
O PHOTON	0- 15	4 3/4	- 1/8	-2.5
A POTTER INSTRUMENT	7- 21	7	- 1/2	-6.6
O PRECISION INST.	0- 13	5 1/4	+ 1/4	+5.0
O RECOGNITION EQUIP	5- 15	6 1/4	- 3/4	-10.7
N SANDERS ASSOCIATES	0- 21	11 1/4	- 1 1/2	-11.7
O SCAN DATA	3- 13	3 1/4	- 1/8	-3.7
O STORAGE TECHNOLOGY	17- 39	20 7/8	- 2 5/8	-11.1
O SYFOR INC	7- 11	9 1/2	0	0.0
O TALLY CORP.	0- 15	12 1/8	+ 1/2	+4.3
N TEKTRONIX INC	34- 64	40	- 8	-16.6
N TELEX	0- 15	4 1/8	0	0.0
O WILTEK INC	10- 26	15 3/4	0	0.0
O BALTIMORE BUS FORMS	5- 9	6 3/4	+ 1/4	+3.8
A BARRY WRIGHT	9- 14	9 1/4	- 1/2	-5.1
O DATA DOCUMENTS	0- 26	19 7/8	- 1/8	-0.6
O DUPLEX PRODUCTS INC	8- 16	9	+ 1/2	+5.8
N ENNIS BUS. FORMS	0- 10	6 1/2	- 1/4	-3.7
O GRAHAM MAGNETICS	15- 27	16 3/4	- 1	-5.6
O GRAPHIC CONTROLS	11- 15	12 1/4	+ 1/2	+4.2
N 3M COMPANY	0- 88	82 1/2	- 1/2	-0.6
O MOORE CORP LTD	42- 57	55 1/8	- 1/2	-0.8
N NASHUA CORP	0- 62	54 1/8	- 5/8	-1.1
O REYNOLDS & REYNOLD	37- 77	47 1/8	+ 3/4	+1.6
O STANDARD REGISTER	0- 20	19 3/4	+ 1 1/4	+6.7

	1972-73 RANGE (1)	CLOSE FEB 22 1973	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS				
O TAB PRODUCTS CO	14- 23	19 1/2	- 1/2	-2.5
N UARCO	20- 28	21 1/4	- 3/8	-1.7
A WABASH MAGNETICS	0- 11	6	- 1/8	-2.0
N WALLACE BUS FORMS	21- 26	24 1/2	+ 1 1/2	+6.5

N BURROUGHS CORP	0-240	229 3/4	- 3 1/4	-1.3
N COLLINS RADIO	14- 27	21 7/8	+ 1/4	+1.7
N CONTROL DATA CORP	0- 78	49	+ 1/2	+1.0
O DATA GENERAL CORP	56-131	123 1/2	- 3	-2.3
O DIGITAL COMP CONTROL	4- 25	3 1/2	0	0.0
N DIGITAL EQUIPMENT	0-105	97 5/8	+ 3/8	+0.3
N ELECTRONIC ASSOC.	6- 13	7 1/8	- 1/2	-6.5
A ELECTRONIC ENGINEER.	0- 14	9 3/4	+ 3/4	+8.3
N FOXBORO	23- 41	28 1/2	- 5/8	-2.1
O GENERAL AUTOMATION	0- 55	49 1/4	- 3 3/4	-7.0
O GRI COMPUTER CORP	2- 5	2 1/8	- 1/8	-5.5
N HEWLETT-PACKARD CO	0- 94	87 1/2	- 2 1/8	-2.3
N HONEYWELL INC	107-170	107 1/4	- 7 1/4	-6.3
N IBM	0-451	444	+ 2 1/2	+0.5

O INTERDATA INC	8- 16	9 7/8	- 1 1/4	-11.2
N MEMOREX	0- 38	12 5/8	- 1/8	-0.9
O MICRODATA CORP	5- 10	8 7/8	+ 1/4	+2.9
N NCR	27- 38	28 3/8	- 5/8	-2.1
N RAYTHEON CO	0- 47	30 1/4	- 1 3/4	-5.4
N SPERRY RAND	30- 50	45	- 1 3/4	-3.7
A SYSTEMS ENG. LABS	0- 16	5 1/2	- 3/8	-6.3
N VARIAN ASSOCIATES	14- 22	15	- 1 3/8	-8.3
N WANG LABS.	0- 61	24 1/4	- 2 1/4	-8.4
N XEROX CORP	121-172	165	+ 3 7/8	+2.4

LEASING COMPANIES

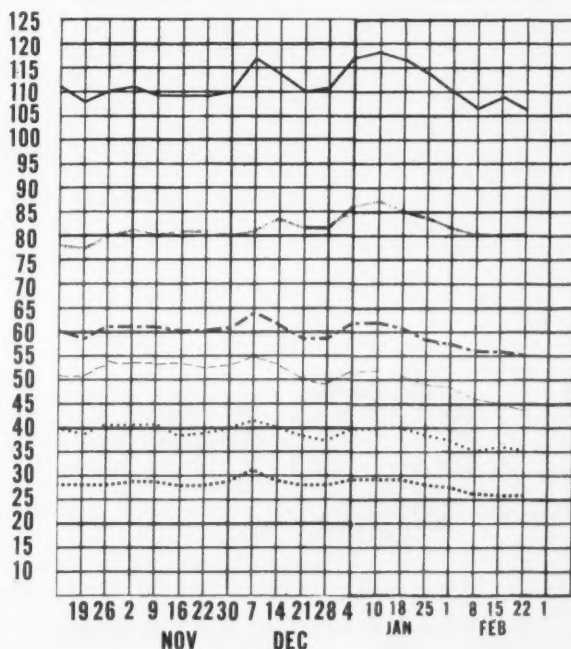
A BOOTHE COMPUTER	0- 18	3 1/2	- 3/8	-9.6
O BRESNAHAN COMP.	1- 3	1 3/8	+ 1/8	+10.0
O COMDISCO INC	3- 18	13 5/8	- 1	-6.8
O COMMERCE GROUP CORP	0- 11	4 5/8	- 1/8	-2.6
O COMPUTER EXCHANGE	1- 3	3/4	0	0.0
A COMPUTER INVSRS GRP	4- 14	4 3/8	- 1 3/8	-23.0
O COMP. INSTALLATIONS	2- 5	2	0	0.0
N DPF INC	0- 13	7 7/8	+ 1/2	+6.7
N DATRONIC RENTAL	2- 4	2 1/8	- 1/8	-5.5
A DCL INC	2- 10	2 1/4	+ 1/8	+5.8
A DEARBORN-STORM	0- 26	20 1/4	- 1 1/8	-5.2
A DPA, INC.	5- 8	6 1/2	- 1/8	-1.8
A GRANITE MGT	0- 11	5	0	0.0
A GREYHOUND COMPUTER	5- 11	5	- 1/8	-2.4
A ITEL	0- 12	8 3/4	- 3/8	-4.1
N LEASCO CORP	12- 24	13 1/2	+ 1	+8.0
O LEASPACE CORP	0- 15	6	0	0.0
O LECTRO MGT INC	1- 4	1 3/8	- 1/4	-15.3
A ROCKWOOD COMPUTER	2- 7	2	- 1/8	-5.8
O SYSTEMS CAPITAL	3- 20	8 7/8	+ 1/8	+1.4
N U.S. LEASING	0- 35	29	- 7/8	-2.9

FXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

Computer Systems Software & EDP Services
Peripherals & Subsystems Leasing Companies
Supplies & Accessories CW Composite Index



Earnings Reports

COM-STUTE Year Ended Sept. 30		
1972	1971	
Shr Ernd	\$5.79	\$1.93
Revenue	312,445	236,322
Earnings	16,916	5,050

EDP RESOURCES Six Months Ended Oct. 31		
1972	1971	
Shr Ernd	\$8.84	\$1.37
Revenue	7,826,647	7,322,913
bSpec Cred	240,560	19,179
Earnings	637,362	1,035,594

a-Restated to reflect adjustment for additional charges to operations for fiscal 1972. b-In 1971, gains on purchase of company's 8-1/2% secured equipment notes, purchase of 7-7/8% debentures and sale of equipment; in 1971 on purchase of 8-1/2% notes.

TAB PRODUCTS Three Months Ended Nov. 30		
1972	1971	
Shr Ernd	\$2.25	\$1.12
Revenue	5,180,000	4,197,000
Earnings	209,000	106,000
6 Mo Shr	.47	.26
Revenue	10,408,000	8,450,000
Earnings	390,000	223,000

COMPUSCAN Three Months Ended Nov. 30		
1972	1971	
Shr Ernd	\$1.12	.....
Revenue	1,408,000	\$457,000
Earnings	166,000	(107,000)
6 Mo Shr	.20	.....
Revenue	2,453,000	601,000
Earnings	273,000	(459,000)

CAMBRIDGE MEMORIES Three Months Ended Nov. 30		
1972	1971	
Shr Ernd	\$1.09	.....
Revenue	1,896,580	\$659,705
Tax Cred	57,000	.....
Earnings	118,099	(31,782)

ALANTHUS Three Months Ended Nov. 30		
1972	1971	
Shr Ernd	\$2.27	\$0.26
Revenue	1,587,972	271,766
Tax Cred	49,173	.....
Earnings	210,809	10,238

DATA CARD Three Months Ended Dec. 23		
1972	1971	
Shr Ernd	\$1.10	.....
Revenue	1,335,000	\$490,000
Disc Op	(13,000)	(24,000)
Earnings	151,000	(31,000)
9 Mo Shr	.18	.06
Revenue	3,442,000	1,829,000
Disc Op	(60,000)	(54,000)
Earnings	266,000	82,000

DATA GENERAL Three Months Ended Dec. 23		
1972	1971	
Shr Ernd	\$1.46	\$1.22
Revenue	9,827,000	5,316,000
Earnings	1,252,000	595,000

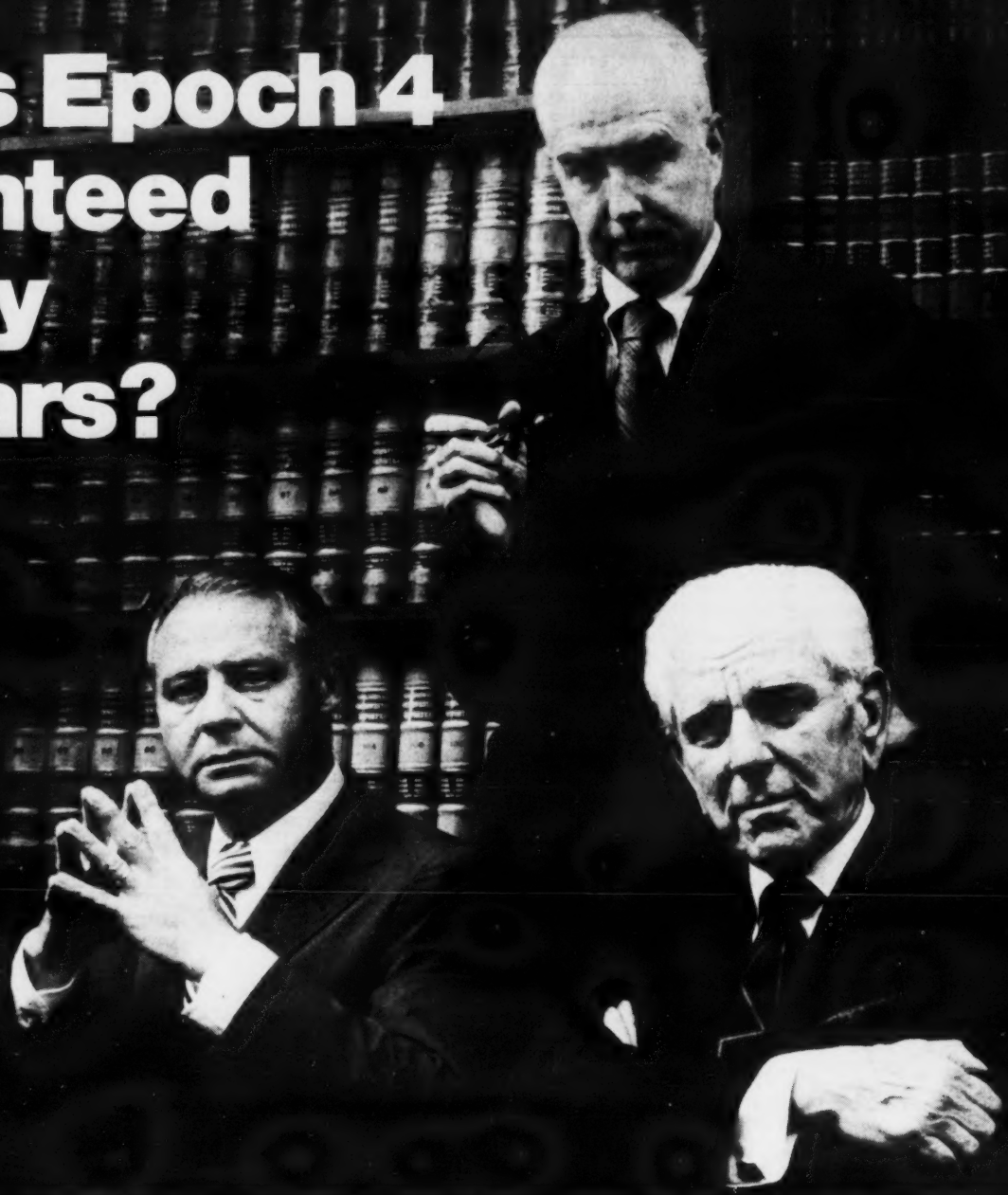
URS SYSTEMS Year Ended Oct. 31		
1972	1971	
Shr Ernd	\$5.52	.....
Revenue	27,654,371	\$24,059,343
Disc Op	.....	(410,604)
Spec Item	c100,541	d(833,533)
Earnings	1,807,985	(350,835)

a-Restated to reflect mergers on a pooling-of-interests basis. b-From continuing operations. c-Credit; tax loss carryforward less other charges. d-Debit; consists of writeoffs of certain deferred charges, capitalized development and loans relating to the computer software field.

COMPUADYNE Year Ended Sept. 30		
1972	1971	
Shr Ernd	\$1.16	.....
Revenue	22,967,653	\$22,337,166
Spec Cred	b388,910	.....
Earnings	712,314	(1,057,200)
3 Mo Shr	.06	.....
Revenue	5,836,413	6,247,245
Earnings	245,287	(322,588)

a-Preliminary. b-T

Why is Epoch 4 guaranteed for only 20 years?



**Our lawyers wouldn't
let us say "forever."**

We figure a 20-year warranty will make our point, even if we can't legally say "forever." *Epoch 4's new coating is so tough, so flexible and resilient, that it withstands the kind of handling that would instantly kill a conventional computer tape.*

Put another way, Epoch 4's new coating is 8000% tougher than the

best competitive products on the market.

We're serious about the 20-year warranty. Because we're serious about Epoch 4's fantastic performance.

Isn't it time you got serious about eliminating dropouts? Isn't it time you got serious about Epoch 4?



**GRAHAM
MAGNETICS**

GRAHAM, TEXAS 76046